THE UNIVERSITY OF ALBERTA

PREDICTION OF ACADEMIC PERFORMANCE IN
THE FACULTY OF BUSINESS ADMINISTRATION AND
COMMERCE AT THE UNIVERSITY OF ALBERTA

by

Ⓒ WALTER EVDOKIMOFF

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The undersigned certify that they have read, and
recommend to the Faculty of Graduate Studies for acceptance,
a thesis entitled PREDICTION OF ACADEMIC PERFORMANCE IN
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Master of BUSINESS ADMINISTRATION.

ABSTRACT

This thesis employs a simple correlation analysis for the purpose of identifying those variables amongst Alberta Grade XII matriculation results and University of Alberta business course requirements which best predict a higher level of academic performance in the Faculty of Business Administration and Commerce at the University of Alberta, Edmonton. It is hoped that the results of this study will be useful in planning future studies concerned with the prediction of academic performance at the university level. Reasons for the need of studies of this nature and prediction studies pertinent to the University of Alberta are summarized in the body of the text.

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CHAPTER I

INTRODUCTION

In 1941, the proportion of Canadian college-age youth enrolling
in university was 4.2 per cent (Jackson and Fleming, 1957, p. 84). The
figure had remained constant since the end of the First World War. By
1955, the proportion had jumped to 7 per cent, and the Canadian univer-
sities were plunged into the crisis predicted by Dr. E. F. Sheffield
of the Educational Division of the Dominion Bureau of Statistics, who
stated that the universities could expect double the number of students
within ten years and four times the number within twenty years (Woodside,
1958, p. 17). Further, this projected increase was not a temporary
"bulge" like the enrollment of Second World War veterans, but rather
a new "plateau" of student registration.

Woodside (1958) suggests that the increase in the proportion of
youth seeking university education has been generated by an increased
birthrate, a large immigration and an increased trend towards univer-
sity attendance. After World War II, the Canadian birthrate rose to
the highest level of any industrial nation. .This natural increase has
been supplemented by the children of the immigrants who have come to
Canada since the Second World War. Finally, growing Canadian prosperity
has enabled continually larger proportions of our youth to seek higher
education.

There is some reason to believe Dr. Sheffield has underestimated
the strength of the trend of increasing university enrollments by pre-
dicting that between 9 and 11 per cent of the college-age group will

seek to go to university in 1965, and between 11 and 14 per cent in 1975. Jackson and Fleming (1957) have suggested that an estimated quadrupling of enrollment in universities by 1975 should be deemed conservative if we may assume that present trends will continue. At the University of Alberta, the enrollment increased from 3,824 full time students in 1955 to 12,992 in 1967. Further, the figure is expected to increase steadily to a total close to 23,300 full time students by 1975 (Cairns, 1968).

Several factors could easily further the growing trend of increasing university enrollments. Canadian industrialists, by offering scholarships and bursaries, bring the opportunity of a university education to many talented young Canadians who might otherwise be denied a higher education. Canadian Council scholarships provide further stimulation and there is also the prospect that even without such direct encouragement, the continued rapid industrialization of the country will induce more young people to make the necessary studies in order to take advantage of the opportunities for university-trained people. Also, as more junior colleges and universities are opened, many of them in centres which have no such institution at present, more and more young people, who could never have gone otherwise, will go to college. Further, the spiral effect of more university graduates sending more of their children to university could prove to be one of the strongest forces in driving up enrollment. In addition, not only may more and more students seek higher education for personal betterment, but they may also seek it for social status. And, as automation advances, arguments in favour of withholding young people longer and longer from the labour market will be strengthened

(Woodside, 1958).

With this seemingly inevitable growth of university registration, a problem of providing facilities and faculty for such an increase seems imminent. It would appear that the universities can ill afford the luxury of admitting those whose likelihood of success is low, at the expense of rejecting those whose likelihood of success is high.

The means of selecting university students was one of the four major problems considered at the conference on the "Canadian Crisis in Higher Education" held at Ottawa, November 12-14, 1956. (Bissell, 1957, p. vi). Preliminary studies were initiated to examine the possible ways of utilizing the human resources that are available to the universities more completely and economically. One of the first tasks was to gather as much information as possible about the pattern of university attendance.

Canadian universities, it appears, do not attract, nor retain, all the young people with aptitudes, interests and traits of character needed to profit from a university education. The fact that many students enrolled in universities lack the qualifications necessary for success is equally apparent. Failure rates of 30 per cent are not uncommon (Jackson and Fleming, 1957, p. 76). Understandably, Dr. Andrew Steward, former President of the University of Alberta, included the following remark in his 1956 Convocation address:
"Too many students who are admitted find it impossible, under conscientious direction from their instructors, to meet reasonable requirements for promotion..." (Jackson and Fleming, 1957, p. 80).

In considering what constitutes a reasonable chance of success at university, it is self-evident that a reasonably high level of

academic aptitude is essential. There are numerous standardized tests
to measure such aptitude, the best known of which is probably the
Scholastic Aptitude Test of the College Entrance Examination Board in
the United States. Other standardized tests include the School and
College Ability Test (SCAT) and the American Council on Education's
(ACE) Psychological Examination. In Canada, it is commonly believed
that our matriculation examinations serve the same purpose (Jackson
and Fleming, 1957, p. 76). How well such tests actually accomplish
their purpose is another matter. Furthermore, little is known about
what type or level of aptitude is essential to ensure a reasonable
chance of success in a particular university pattern. How competent
the student may be in mathematics may be a question of limited rele-
vance to some courses, but of vital importance to others.

The amount of general information the student has acquired would
also seem to be an important consideration in determining his chance
of success at university. Both basic skills and level of knowledge
are assumed to be measured to some extent by high school examinations.
However, it is almost impossible to separate the two elements and to
determine the amount of weight that should be given to each in most
of the examinations set by the provincial departments of education
across Canada. Indeed, some authorities question the validity of the
assumption that there is need for a specific background of knowledge
for university success (Jackson and Fleming, 1957).

Personal characteristics such as interests, drive, persistence,
physical health and emotional maturity would also influence a student's
performance at university. Excellent academic results can not be
achieved without the presence of at least some of these desirable

personal qualifications. However, as is true of basic skills and level of general knowledge, research has not yet reached the point where one can identify which personality factors, singly or in combination, help to account for high or low achievement in university.

By virtue of their complexity and general elusiveness, the effect of environmental factors on university performance are equally difficult to measure and weigh. Factors such as whether the student's parents are living, whether the family's relations are amicable or not, family income, parent's occupation, parent's education, size of family, or the parent's attitude towards higher education may all have an important influence on the student's success at university. Other influencing factors may include racial origin, sex, religion, and the influence of friends and teachers. The extent of an individual's knowledge of his own capabilities and the opportunities available to him may also be influential. Further, the existence of invalid admission standards may also prevent an otherwise well-qualified individual from enrolling in certain courses. Even the internal university environment itself is not beyond reproach. The practice of assigning young, inexperienced instructors to large freshmen classes may leave much to be desired. In addition, the practices followed in setting and marking some university examinations are probably far from being models of perfection. Also, the belief (whether valid or not) that one's efforts have not been, or will not be evaluated fairly and justly, undoubtedly discourages the pursuit of higher education.

Most university registrars affirm that matriculation standing is the best single criterion of admission to university (Woodside, 1958, p. 56). Dr. Andrew Steward, has stated that "in our experience

there has not yet been devised any basis of predicting success in university examinations, as satisfactorily as success in high school examinations" (Zurowsky, 1959, p. 41). Yet, the matriculation examinations are but a series of single tests carried out in a two week period of a student's life (although subject to appeal and review and, of course, a second try). In view of the large proportion of "misfits" and failures entering the universities, it is little wonder that the validity of matriculation standing as a university admission requirement should be questioned. In the study Who Goes to University, Jackson and Fleming (1957) conclude in the following manner:

(1) We really know appallingly little about our university students, in general or in particular.

(2) The little we do know all points to the inescapable conclusion that we are extremely wasteful of our limited resources of human talent; we may be utilizing little more than one-quarter, perhaps at most one-third of the talents of our gifted young men and women.

(3) We must secure more information before we can do any sensible planning, and we must be prepared to pay the cost in time, effort, and money.

(4) Finally, if we are short of trained personnel, it is our own fault. The intellectual and other abilities are present in sufficient quantity in every generation; we not only fail to use them, we fail even to recognize them.

In Alberta, concern over the validity of the system of selecting students for university education (demonstration of appropriate matriculation standing) has led to the appointment of the Matriculation Study committee, a subcommittee of the Joint Committee to

Coordinate University and High School Curricula (Evenson and Smith, 1957). The subcommittee's terms of reference were set up as follows:

(1) Test the validity of Grade IX examinations and other tests as a measure of success in (a) Senior High School and (b) University;

(2) Test the validity of Grade XII examinations as a measure of success in (a) High School and (b) University;

(3) Test the validity of success in non-academic subjects as a measure of success in University;

(4) Study the experience of other universities in testing other types of matriculation programs.

The interim conclusions of the Matriculation Study Committee (Jackson and Fleming, 1957) were as follows:

(1) Previous doubts as to the validity of the Grade XII average as a single criterion of university success are confirmed.

(2) Drop-outs at all stages of High School and University are high; and the reasons for these drop-outs are not clear.

(3) Further investigations are required to follow up these leads, both by continued analysis of the 1951 study, and by supplementary studies.

These "further investigations" (referred to above) have been launched and are summarized in the chapter to follow. As a result of the implications of these investigations, it is the purpose of this paper to examine the adequacy of the University of Alberta high school matriculation results in predicting successful academic performance in the Faculty of Business Administration and Commerce at the University of Alberta. It is hoped that the results of this exploratory study will provide useful information for planning future studies

related to the improvement of methods of selection and placement of students desiring to enter the Faculty of Business Administration and Commerce at the University of Alberta, Edmonton.

CHAPTER II

A SURVEY OF THE LITERATURE RELATING TO THE PROBLEMS
OF ADMISSION TO THE UNIVERSITY OF ALBERTA

Summaries of predictive research findings were compiled and
evaluated by Travers (1949) Garrett (1949) and Henry (1950). Travers
found that the high school average was consistently the best single
predictor of university performance. Following in order of validity
as predictors were subject matter tests and tests of scholastic
aptitude. Travers also found that in studies of non-intellectual fac-
tors such as level of adjustment and interest, consistently low corre-
lations with university performance were derived. Garrett found that
the high school average showed the greatest correlation with univer-
sity scholastic average, and ranged from .29 to .82 with a median of
.56. Henry also concluded that the high school achievement record
was the best single predictor of university success. Further, person-
ality measures failed to demonstrate any appreciable relationship with
university performance. Other factors such as size of family, nature
of part-time employment, and parental occupation showed either low or
inconsistent relationships.

Comprehensive studies which were concerned with prediction of
scholastic performance in university began in Alberta with the estab-
lishment of a Matriculation Study Subcommittee by the Department of
Education (1954). The purpose of the Study Subcommittee was to
examine the "validity of the present predictive system of selecting
students for university education" (Evenson and Smith, 1957, p. 68).
As its first project, the Study Subcommittee examined the predictive

validity of the Alberta Grade XII Departmental results and the American Council on Education's (ACE) Psychological Examination (Evenson and Smith, 1958). The freshman class of 1951 was selected as the sample.

The results of the study indicated that the Grade XII achievement record is a better single predictor of university freshman success than the intelligence test (ACE). The correlations between the Grade XII Departmental average and university average from years one through four of the university program were .48, .54, .36 and .50 respectively. Comparatively, correlations of ACE with the university average over the same period were .36, .16, .15 and .18. Further, the Study found that the best predictor of university success at the senior level was the freshman average. Correlations between the freshman average and the second, third and fourth year university average were .63, .45 and .47 respectively. For the study, students were drawn from all Faculties. The number of students from each Faculty ranged from 116 to 881 with the median number of subjects per Faculty being 181.

A second project of the Matriculation Study Subcommittee was a study of the 1956 Grade XII graduating class in Alberta. Since the results of the 1951 Freshman Study indicated the superiority of Grade XII results over ACE results in predicting first year university performance, the Subcommittee investigated the relationship between Grade XII marks and other predictor variables. The College Entrance Examination Board's achievement battery (CEEB), the Scholastic Aptitude Test (SAT) and the School and College Ability Test (SCAT) were included in the study.

The Subcommittee chose the seven CEEB achievement tests which corresponded to the Alberta Departmental examinations in Mathematics 31,

Mathematics 30, Physics 30, Chemistry 30, Biology 32, English 30, and French 30. A province-wide sample of 1435 students was drawn. Each student, in a special testing program, then wrote two of the CEEB tests which corresponded to his Grade XII tests, as well as the SAT and SCAT examinations.

Correlations between CEEB test scores and university first year average were compared with correlations between Departmental marks and university average. The seven Departmental subject marks consistently showed a higher correlation with university average ((range of r=.24 (English 30) to r=.58 (Physics 30); r mdn.=.45)) than did the corresponding CEEB examinations (range of r=.20 (English) to r=.41 (Mathematics 31); r mdn.=.34)). Evenson and Smith (1958) concluded that there was no evidence that would support the use of the CEEB tests as a replacement for the comparable Departmental examinations in the selection of university students in Alberta.

The correlations between SAT-V, SAT-M, SCAT (level 1) and the first year university average were .27, .30 and .29 respectively. Such results seem to imply that these tests are of little value in predicting university performance.

Black (1959, 1960) continued the analysis of the data gathered in the 1956 Grade XII survey. In order to compare the Grade XII Departmentals with the selected standardized tests used in the Subcommittee's study, 529 of the 1956 Grade XII class who took part in the special testing program and who entered the University of Alberta in 1956 were selected for study. Along with the test scores provided by the 1956 Study, Black included the students scores in the ACE Psychological Examination which were provided by the University Student

Advisory Service.

As predictors of university first year average, the standardized
tests ranked CEEB, SAT, SCAT, and ACE, in descending order of value.
Also, after calculating the respective correlations of university
average with the individual CEEB tests and with the Departmental
Examinations for the same group of students, Black (1959) found that
the Departmentals, with the exception of English 30, consistently did
a better job of predicting the university average than did the corres-
ponding CEEB test. The Departmental correlations ranged from r=.168
(English 30) to r=.572 (Mathematics 31) with a median of .552 (Biology).
The CEEB correlations ranged from r=.194 (English) to r=.408 (Advanced
Mathematics) with a median of .354 (French).

In 1960, Black compared combinations of the standardized tests
used in the 1956 Grade XII survey with combinations of Departmental
marks. In this study an Engineering freshman sample (N=131) was dis-
tinguished within the criterion group, which consisted of a total
university freshman sample (N=529). Zero-order correlation coeffi-
cients between the predictor variables and the university average
again carried the implication of the Departmental's greater effec-
tiveness in prediction over the other variables used. In descending
order, the three best single predictors were Departmental marks in
Science, Mathematics and Foreign Language for both groups. The
three highest correlation coefficients were .632, .500 and .434 (total
university freshman sample) and .620, and .598 and .482 (Engineering
freshman sample). The differentiation of the criterion groups appea-
red to be worthwhile as evidenced by the differences in correlation
coefficients obtained.

Black (1960) also compared various combinations of predictor variables on the basis of multiple correlations. The results indicated that a combination of the seven Grade XII Examination scores required for admission to the Faculty of Engineering yielded as great a multiple correlation coefficient with the freshman Engineering average ($R_7=.686$) as the combination of twenty-five other predictor variables used ($R_{25}=.687$). Black concluded that the combination of English 30, Social Studies 30, Mathematics Average, Science Average and Foreign Language Average yielded the best operational combination for all the university course areas studied (Black, 1960, p. 45).

Zurowsky (1959) was concerned with the relative predictive value of such variables as Grade IX Departmentals, Grade XII Departmentals, SCAT, Co-operative English Mechanics and Co-operative English Reading Comprehension examinations. The university criteria used were seven selected science courses, two business administration courses and the freshman average. The subjects in this study were 529 members of the 1956 Grade XII Survey who entered the University of Alberta in 1956.

The largest zero-order correlation coefficient of the predictor variables was found to be that of Grade XII Science average (range of $r=.492$ to $r=.720$; r mdn.$=.632$) for 9 of the 10 criteria. The exception was Commerical Law 41 as correlated with Social Studies 30 ($r=.559$, N=31). Multiple correlation coefficients between a combination of the Grade XII battery, SCAT (V and Q) and the Co-operative English tests with the university criterion were also computed. The improvement in the correlation coefficients by using the entire battery of predictor variables rather than the best individual predictor ranged from -.004 to .050 (median improvement in correlation coefficient

.050). Although the actual improvement was apparently not tested for significance in this study, the generally slight improvement in correlation obtained by using all the predictor variables seems to provide some reason to doubt any implication that the use of a multiple correlation technique might provide the best means of predicting the university criterion.

In comparing a battery of Grade XII Departmentals with a battery of SCAT subtests and Co-operative English tests combined, Zurowsky (1959) found that the Grade XII battery was the most effective predictor of university marks for all ten university criteria used. Only a slight improvement in predictor ability was indicated by using the entire battery of Grade IX and Grade XII Departmentals, SCAT and Co-operative English tests, as compared to the predictive ability of the battery of the five Grade XII Departmentals alone. However, no results of testing for significance of difference were included in the report.

In analyzing the contributions of the predictor variables in the Grade XII battery by comparing their beta weights in multiple regression equations, Zurowsky (1959) concluded that the Grade XII Science average consistently contributed more heavily than the other Grade XII subjects in predicting first year university scholastic performance. The Grade XII Foreign language marks did not contribute to the prediction batteries (Zurowsky, 1959, p. 93).

Two other studies that had been conducted at the University of Alberta were reported by Clark (1958). Fitzpatrick studied 253 freshmen enrolled in the Engineering faculty in 1954-55. He found that the best predictor of university freshmen average was the Departmental math-science average which yielded a correlation coefficient of 0.67.

The ACE Psychological Examination was found to yield a correlation coefficient of 0.23 with university average. Fair studied one hundred Arts freshmen who enrolled at the university in 1953 and found the correlation of the Departmental average with freshmen university average to be 0.64, while the corresponding correlation for the ACE Psychological Examination was 0.40. Fair also examined the effectiveness of the Departmental average, ACE and the first year average in predicting the third year university average. The relative superiority of Departmentals over ACE was maintained in predicting third year average, but the best predictor of third year average was found to be the freshmen average, which yielded a coefficient of correlation of 0.69 (Clark, 1958).

Mack (1963) studied groups of freshmen in terms of the faculty in which a student was enrolled. The five faculty criteria were grouped as to Arts, Science, Education, Engineering and others. In each case, the high school departmental average proved to be a better predictor of university average than either the ACE Psychological Examinations or the Co-operative English tests. The Grade XII average correlated most highly with marks of Faculty of Science students (r=.715) and lowest with Education students (r=.450).

Knowles and Black (1965) investigated the influence of sex, size of school and faculty chosen upon the effectiveness of predicting university freshmen success. The sample chosen consisted of the 1962 freshmen class at the University of Alberta, Edmonton, who had graduated from a recognized Alberta high school in June of that year (a total of 1,017 students). Only those students who entered the Faculties of Arts, Education, Engineering and Science were chosen. Further,

only those students who had matching Departmental and Principals'
Rating scores in English 30, Social Studies 30, and at least one course
in each of Mathematics, Science and Foreign Language were chosen for
the study. When students had more than one course in an area, for
example Chemistry 30 and Physics 30, these marks were averaged to
give a single score, Science Average. The same procedure was followed
in mathematics and foreign language. The average mark received by
each student in his freshman year was used as the criterion variable.
Each student was also classified as to sex and as to size of his grad-
uating high school as indicated by the number of teachers on staff.

Using a Stepwise Regression technique, the data yielded for
each sample's predictor and criterion variables, the means, standard
deviations, zero-order and multiple correlations, the beta weights,
and the constant for the regression equation. The program was such
that the predictor variables were taken in successive order, deter-
mined by the amount each contributed to the prediction. All predic-
tor variables were used.

On the basis of the evidence presented, it was concluded that
differences in performance and prediction do exist relating to sex,
faculty, and size of graduating high school. In the case of the size
of high school, it was found that two significant categories of size
of school could be identified from the data: small high schools with
twenty-five or fewer teachers, and large high schools with more than
twenty-five teachers. When the ranks of the means for the different
subjects from each school category were examined, it was found that
the large school category ranked consistently in the top three. When
the means and standard deviations for the two classes of schools were

calculated and tested for significance of difference, all mean differences were significant at the 5 per cent level or higher. The difference between the two multiple correlation coefficients, .560 and .753, for the small and large schools respectively, was found to be significant at the 1 per cent level of confidence.

In examining whether the prediction of success is more efficient in some faculties than in others, Knowles and Black (1965) computed the multiple correlation coefficients between the five departmental score predictors and the University Freshman average. The Freshman average was differentiated with reference to four faculties: Engineering, Science, Arts and Education. The corresponding multiple correlation coefficients were .750, .737, .653 and .596 respectively. The difference in the size of the validity coefficient was statistically significant between Education and both Science and Engineering at the 1 per cent level of confidence.

Further, in examining sex differences in predictive efficiency, Knowles and Black (1965) found that, in each case, the higher correlation coefficient was found in the female sample (Arts r=.558 as to r=.746; Education r=.470 as to r=.634; Engineering r=.750, and Science r=.722 as to r=.796). Differences in male and female science students were not statistically significant. All other scores are significant at .05 or better. Knowles and Black (1965) concluded that the prediction of freshman success at the University of Alberta could be improved by considering the sex, size of graduating high school, and the faculty the student proposes to enter.

In 1965, Knowles and Black also examined the effectiveness of Principal's Rating scores in predicting freshman success at the

University of Alberta. These scores are confidential estimates of how well a student is expected to perform in the Grade XII Departmental Examinations. These scores for each Grade XII course taken by each Grade XII student are submitted by each high school principal to the Department of Education for use when the student is unable to write the Departmental Examinations for compassionate reasons. The sample chosen for this study consisted of 1017 students entering the four Faculties of Arts, Education, Engineering and Science at the University of Alberta, Edmonton, in the fall of 1962. The sample was so selected that each student had both Departmental and Principal's Rating scores in English 30 and Social Studies 30, and at least one in each of Mathematics, Science and Foreign Language, to a total of six Departmental scores. Where more than one examination had been written and more than one Principals' Rating was available in one of these last three areas, the scores were averaged in the area concerned to give an average mark in Mathematics, Science or Foreign Language.

Upon examination of their data, Knowles and Black (1965) concluded that there was sufficient evidence to suggest that the Principals' Ratings tend to be lower than the Departmental scores actually achieved. However, apart from the tendency to assign lower marks, the Principals' Ratings generally follows a similar pattern to that found for the achievement test scores on the departmental examination (Knowles and Black, 1965, p. 130). The multiple correlation coefficients of the Five Grade XII Principals' Rating predictor variables and the criterion variable (University freshman average) were computed and compared to coefficients computed from Departmental score predictor variables. The coefficient of correlation involving the Principals' Rating as a

variable proved to be numerically lower in each of the four faculty catagories. However, there were no statistically significant differences between the coefficients obtained by either set of predictor variables. Knowles and Black (1965) concluded that while the Principals' Ratings did not give as good a prediction as the Departmental scores, the loss in predictive value was small. When predicting University freshman success using the Principals' Ratings for the total population (N=1017), the loss in predictive efficiency is only 2.4 per cent over that when the Departmental scores are used as the predictor variables (Knowles and Black, 1965, p. 130).

Black and Knowles (1965) continued the examination of the data gathered from the 1017 freshman students who entered the University of Alberta in the fall of 1962 by comparing the effectiveness of predicting freshman success at the University, using two methods:

(1) differential prediction using the individual Grade XII scores,

(2) a single predictor, the Grade XII average.

Black and Knowles used two groups of predictor variables in their comparison: first, the reported scores from the Grade XII Departmental examinations; and second, the Grade XII Principal's Rating scores. As established in earlier studies, the sample was also broken down by size of graduating high school, sex and faculty entered.

Of the thirty-nine subgroups of the sample, in no instance was the Principal's Rating average numerically higher than the Departmental average. Where male and female comparisons were made, in all but two instances female high school averages were numerically higher than male averages. In terms of Departmental averages, both male and female averages from large high schools (those with 26 or more teachers)

were significantly higher than those students graduating from small

high schools. In terms of faculties, mean high school averages nume-

rically ranked from highest to lowest were Science, Engineering, Arts

and Education. The order of rank was true for both the Departmental

and Principal's Rating score averages.

In terms of University freshman averages, students from large

high schools did better than those students from small high schools,

and female averages were higher than male averages. According to

the faculty entered, rank standings indicated the highest average

performances in Science, the lowest in Engineering and a slight nume-

rical advantage of Arts over Education (Black and Knowles, 1965, p.

268).

Upon examining the multiple correlation coefficients (five sub-

ject variables) and the zero-order correlation coefficients (average

of the five subject variables) between the criterion and the Grade

XII Departmental and the Principal's Rating scores, no instance was

found where the difference between the two correlation coefficients

was statistically significant. Black and Knowles, (1965, p. 268)

concluded that the differences between the correlation coefficients

in most instances were so small that, for operational uses, the slightly

better predictions gained by using the more complicated multiple regre-

ssion technique are offset by the use of the more readily calculated

prediction from the single high school average predictor. Further,

upon examining any differences in the effectiveness of the Grade XII

Departmental averages and the Principal's Rating average as predictors

of University freshman average, no statistically significant differ-

ence was found. Numerically, however, the Departmental based averages

were generally higher. Also, female scores were predicted with greater

accuracy than those for males, using either predictor.

In 1966, Black and Knowles reported the results of their study

concerned with the effects of adding academic aptitude test scores to

the Principal's Rating average as a means of improving prediction

of freshman performance, before the student leaves high school. They

also examined the effects of normalizing data to improve predictions.

The above objectives were examined with respect to the student's sex,

faculty entered, and the size of the graduating high school as defined

in their earlier reports. The data were also examined with regard to

two Grade XII marking systems: the Departmental score average, and

the Principal's Rating score average. The test of academic aptitude

used was the American Council on Education's Psychological Examination

for College Freshman (ACE). The ACE gave two sub-scores: a verbal or

linguistic score (L), and a mathematical or quantitative score (Q).

The test was administered to freshmen in 1962. The sample consisted

of 1010 students. No significant difference was found to exist bet-

ween this new sample and the sample of 1017 students (1962) which was

used for previous reports by Black (Black and Knowles, 1966, p. 28).

Multiple correlations involving the two ACE scores and each of

the two Grade XII averages in turn were computed against the Univer-

sity Freshman average. Zero-order correlation coefficients between

the two Grade XII averages and the university criterion were also

computed. With the sole exception of males from small high schools

enrolled in Arts, the addition of ACE scores to the Departmental

average adds not more than .05 to the size of the correlation coeffi-

cients and in no instance were any of the differences found to be

statistically significant. It was concluded that "while the addition
of the two ACE scores to either the Departmental or Principal's Rating
Average did improve the prediction of University success, the numeri-
cal gains in the validity coefficients were so small that even in the
event that they had been statistically significant, the improvement
in predictive efficiency in most instances would not warrant their
inclusion in an operational setting unless such scores were normally
available as part of the students record" (Black and Knowles, 1966,
p. 31).

To test the effect of normalizing data as a means of increasing
validity coefficients, Black and Knowles (1966) converted the two
Grade XII averages, the ACE scores and the freshman averages to nor-
malized T scores according to faculties. The findings for the faculty
totals showed modest differences between regular and normalized data
based coefficients, none of which were statistically significant
(Black and Knowles, 1966, p. 35). Moreover, in some cases, the corre-
lation coefficients derived from the normalized data were found to be
numerically lower than those previously obtained.

Implications of Alberta Studies

With regard to the influence of sex, faculty entered and the
size of graduating high school on the prediction of university fresh-
man success, a difference was found between the performance and pre-
dictability of freshman averages of graduates from large high schools
(more than twenty-five teachers) and those from small high schools.
The performance of the graduates from the larger high schools tends
to be better than that of students from smaller schools. Sex differ-
ence generally favoured female students in level of performance and,

particularly, in the predictability of University marks. Faculty differences were found, although it was not determined whether these were a result of the admission requirements for each faculty or the influence of the schools from which the students graduated.

The Principals' Rating Scores are, as predictors, as good as, or more effective than, the Departmental scores for predicting the scores of male students from small high schools. However, they are less effective for all students in the large high schools, and for females from small high schools. With the exception of males from small high schools, the Departmental scores are generally not more than 2 per cent more effective as predictors of University Freshman success than the Principals' Ratings (Black and Knowles, 1966).

Regarding the procedure of predicting scores (Black, 1966, p. 114) concludes that the ranking in efficiency, whether for Departmental or Principal's Rating scores, appears to be of the following order:

(a) differential prediction using the individual scores from five Grade XII subject areas: English 30, Social Studies 30 and at least one score in each of Mathematics, Science and Foreign Language (R);

(b) the Grade XII average and the ACE L and Q scores in a multiple regression format (Ra);

(c) the average of the six Grade XII subject scores submitted for admission (r);

(d) the Grade XII average to predict Freshman average when both variables have been normalized by faculty entered (rn);

(e) the Grade XII average and ACE L and Q scores in a multiple regression format to predict Freshman average when all variables had

been normalized by faculty (Ran).

Notwithstanding these conclusions, there are only relatively small differences in predictive efficiency of one procedure over the other (Black, 1966, p. 114). Such findings seem to indicate that any slight improvement which may ensue from using more complex admission procedures would be offset by the cost involved in contrast to that of the present relatively simple procedure which only requires a specific average in a series of specified Grade XII subjects. However, Principals' Ratings, while generally slightly less effective than the Grade XII Departmental Average, may offer a time advantage in their use in academic guidance and administrative planning at the University, as they are available two and a half to three months before the Departmental results.

Summary

Generally, of the many types of predictors of university success considered in Alberta to date, the Grade XII Examination results seem to be the most valuable. Grade XII marks have been found to be superior to standard achievement test scores, scholastic aptitude tests and Grade nine results. As the best single predictor, findings tend to support the high school average. However, there is an indication that the use of course marks provided the best discriminators. The Science average, for example might be given more weighting than poorer predictors. Further, differentiation as to Faculty may offer improved predictive accuracy as compared to treating the total student population as one group.

In studies of multiple prediction, the Grade XII battery has been found to be superior to other batteries of predictors. Very

little improvement resulted from combining scholastic aptitude test scores or results from standard achievement tests with the Grade XII battery.

At the present time, non-intellectual predictor variables offer little hope in improving predictive measures over those provided by conventional measures of achievement and aptitude.

CHAPTER III

DESIGN OF THE STUDY

The study is of an exploratory nature concerned primarily in discovering which of the Grade XII matriculation results are most closely correlated with the academic performance of students registered in the Faculty of Business Administration and Commerce at the University of Alberta. It is hoped that the results of this study will add to the existing knowledge concerned with prediction of academic performance at the university level by providing information useful in planning future studies that may improve the selection and placement of students desiring a business education.

To identify those variables most closely related to the academic performance of business students at the University of Alberta, a simple correlation analysis was employed. No attempt was made at regression analysis. While it is recognized that the ultimate goal of any science is precise prediction, unless correlations of a very high order are derived from the data collected for this study, the use of any regression equation for prediction purposes would be pretentious. On the other hand, as studies of this nature mature, and as the important variables become identified, greater attention can be then focused upon methods of more exact prediction.

Predictor Variables

Grade XII Departmental examinations are administered each year by the Alberta Department of Education. Matriculation students write these tests during the latter part of June. The results of these

tests are subject to review and a supplemental examination. Admission to the Faculty of Business Administration and Commerce at the University of Alberta are based on these matriculation scores. Admission requirements (1967-68) include an average mark of at least 60 per cent and a minimum acceptable mark of 50 per cent in three compulsory matriculation subjects: English 30, Social Studies 30, and Mathematics 30: and three of the following optional matriculation subjects: Chemistry 30, Physics 30, Biology 30 (or Biology 32 if written before September 1965) Mathematics 31 (if taken in June 1962 or subsequently) and a Foreign Language (French 30, German 30, Latin 30, Ukranian 30, or any other approved language other than English at an equivalent level). However, in the coming 1968-69 winter session, Commerce students at the University of Alberta may be admitted with a choice of only two optional subjects along with the three compulsory pre-requisites listed above.

Examination policies for Grade XII are set by the High School and University Matriculation Examinations Board. This board, consisting of representatives from the Department of Education, the Alberta Teachers' Association and the University of Alberta, takes the full responsibility for final examinations. It is directly involved in choosing examiners who set the various papers and in the checking of the final draft of each examination. All policies are subject to approval by the Minister of Education. Each committee of examiners chosen is responsible for setting four papers in the subject designated by the board. Teachers appointed to the various committees must always be teaching the subject involved at the time of their appointment.

The committees submit the drafts of the papers to the Supervisor of Examinations by early October. At that time, a revision committee, consisting of teachers, one university representative and one Department of Education official, reviews the paper in detail and makes whatever alterations necessary. Final approval of the papers is then given by the respective boards and the papers are forwarded to the printer.

The examination papers are marked by committees of teachers who had taught the course during the school year. Each committee is headed by a chairman who is responsible for consistency in marking and for reporting irregularities to the Supervisor of Examinations.

Prior to June 1966, raw examination scores in each matriculation subject were scaled to an approximate normal distribution and final matriculation marks for each student in each subject were thus obtained. The lowest 40 per cent of these normalized subject scores received failing final marks of less than 50 per cent. This scaling procedure keeps the percentage of passes and the median mark constant from subject to subject and from year to year.

In June 1966, the High School and University Matriculation Examination Board instituted a new scaling procedure for obtaining the final Grade XII examination marks for Alberta high school students. Each year, every matriculation student in the province now writes the School and College Ability Test (SCAT), the results of which approximate a normal curve. The SCAT scores are then utilized as an "ability base" for all the matriculation students in the province for that particular year. The results of the individual matriculation examinations are then super-imposed on this "ability base". Any matriculation examination

score lower than a predetermined cut-off point on the "ability base"
is granted a relative failing mark of less than 50 per cent.   Presently,
the cut-off point on this province wide "ability base" is the lowest
15 per cent of the total SCAT scores.

By the implementation of the new scaling proceedure, the Board hoped
to provide a better method of determining matriculation standing for
Alberta students.   It was found, for example, that students in certain
courses (Mathematics 31 will be used as an illustration) often had a
higher mental ability than the norm of all Grade XII students in the pro-
vince.   Under the old scaling procedure, 40 per cent of the Mathematics
31 students would receive failing scores on their final grades regardless
of their over-all mental ability or the relative difficulty of the course
taken.   Had these failing Mathematics 31 students enrolled in a relative-
ly easier Grade XII option course, they might very well have been able to
complete their requirements for a Matriculation standing.

Under the new scaling procedure, the Mathematics 31 mark obtained
by each individual is compared directly to the ability scores of every
matriculation student in the province.   Only if the Mathematics 31
score indicates a lower grade than the predetermined cut-off point on
the province wide ability scores will a failing mark be granted.
Therefore, with respect to ability, each Mathematics 31 student is in
competition with every Matriculation student in the province.   If the
over-all ability of the Mathematics 31 class is high, markedly fewer
than 40 per cent will receive failing grades.   Indeed, it is possible
that none need fail at all.

The over-all effect of the new marking procedure is that more
students are granted a matriculation standing.   As a consequence, more

students are admitted to the University of Alberta. Had not the scaling procedure been changed, approximately 25 per cent fewer students would have registered at the University of Alberta in September of 1966 (Reid, 1968).

University Criteria

Changes in the Grade XII grading procedure were introduced in June of 1966. In September of the same year, the University of Alberta also adopted a new grading system. The new system employed a scale from one through nine:

9

8 Excellent

7

6 Good

5

4 Pass

3

2 Fail

1

In courses taken towards an undergraduate degree, the minimum passing grade is 4 unless otherwise specified; in courses taken towards a graduate degree, the minimum passing grade is 6. A grade of 3 in an individual course will be accepted by a faculty of school only if warranted by a student's over-all academic record. First class standing in a given year is awarded to any student who secures a grade-point average of not less than 7.5 in the work of that year. For second class honours marks, a grade-point average of 5.5 is required.

Previous to the Winter Session of 1966-67, the University of Alberta employed a percentage grading system. The minimum passing grade in courses taken towards an undergraduate degree was 50 per cent; in courses taken towards a graduate degree, 65 per cent was required. First class standing in a given year was awarded to any student who secured an average of not less than 80 per cent in the work of that year; a second class honours mark was recognized for an average of not less than 65 per cent.

For the benefit of any students who were enrolled in the faculty of Business Administration and Commerce at the time of the grading system change-over, the faculty devised a method of converting the percentage scores of the student's earlier record to the new grade-point system. The conversion table is as follows:

PERCENTAGE	GRADE-POINT
90-100	9
80-89	8
73-79	7
65-72	6
58-64	5
50-57	4
40-49	3
30-39	2
0-29	1

It should be noted, however, that the preceding table is applicable only for the Faculty of Business Administration and Commerce. Other faculties at the University may very well employ other conversion

techniques that suit their own individual needs. Furthermore, the
table does not provide a precise conversion. For example, a student
may have less than a second class standing (less than 65 per cent aver-
age) on the percentage scale, but upon conversion to the grade-point
system, his average mark may indicate a six (second class honours mark).
Such inconsistencies are inherent upon conversion due to rounding errors.
The table, therefore, is only an approximation and should be used with
this limitation in mind.

In view of the change in grading systems at both the high school
and university level, the rounding errors inherent in converting the
percentage scores to grade-point scores and the incompatability of the
two grading systems in correlation analysis, this study was generally
catagorized as follows:

(1) Analysis of those students who had registered with the Faculty of
Business Administration and Commerce and who had graduated from a recog-
nized Alberta high school in June of 1966 or subsequently;

(2) Analysis of those students who had registered with the Faculty of
Business Administration and Commerce and who had graduated from a
recognized Alberta high school prior to June of 1966.

A total of 276 student records were chosen for analysis in this
study. All students had matriculated from a recognized Alberta high
school and had registered in the Faculty of Business Administration and
Commerce at the University of Alberta, Edmonton, within a six year
period, 1962-1967 inclusive. All data was collected with the co-opera-
tion of the Student's Records Office at the Faculty of Business Adminis-
tration and Commerce. Subjects were drawn from each of the six academic
years under analysis.

Sample One

The first sample consisted of 43 freshman who had entered the Faculty of Business Administration and Commerce at the University of Alberta in September of 1967. Only those freshmen who had graduated from a recognized Alberta high school in June of that year were chosen. Furthermore, each student had completed his matriculation within one school year and without the benefit of Grade XII supplemental examinations. In this sample, each student record consisted of a total of sixteen variables:

PREDICTOR VARIABLES (1967)

(1) English 30

(2) Social Studies 30

(3) Mathematics 30

(4) Chemistry 30

(5) Physics 30

(6) Biology 30

(7) Mathematics 31

(8) Foreign Language

(9) High School Average

UNIVERSITY CRITERIA (1967-68)

(10) Accounting 202

(11) Business 202

(12) Economics 200

(13) English 210

(14) Mathematics 240

(15) Arts or Science Option

(16) First Year University Average

The predictor variables consisted of the final matriculation scores granted to each student by the Department of Education. Each record consisted of six Grade XII subject scores and the student's high school average grade. Subjects not taken as optional courses were coded accordingly. The university criteria were the final grade-point averages granted to the student upon completion of the university year, but prior to any supplemental examination or change in grade by the

university Board of Revisions. Wherever possible, the above conditions regarding university and high school scores were held consistent in each sample taken in this study.

Sample Two

The second sample consisted of 46 Commerce students who had regis- tered in the university as freshmen in September of 1966. Each student had graduated from a recognized Alberta high school in June of the same year. As in sample one, each student had completed his high school matriculation requirements within one year and without the benefit of supplemental examinations. In this sample, two years of university study (1966-67 and 1967-68) were available for analysis. Therefore, along with the sixteen variables as listed in sample one, each student had an additional ten variables to account for his second year univer- sity work:

(17) Business 310

(18) Psychology 202

(19) Business Statistics 308

(20) Business 320

(21) Computing Science 351

(22) Accounting 204

(23) Mathematics 243

(24) Business 312

(25) Arts or Science Option

(26) Second Year Average

Samples one and two, therefore, consisted of the complete academic records (under the conditions stated) of those students who had matri- culated from a recognized Alberta high school and had entered the

Faculty of Business Administration and Commerce at the University of
Alberta, Edmonton, under the new grading and scaling procedures initia-
ted at both the high school and university level in 1966.

Sample Three

Sample three consisted of those students who had entered the
Faculty of Business Administration and Commerce at the University of
Alberta as freshmen in September of 1965. Of the 51 students drawn
for the sample, 41 had completed their Alberta high school matricula-
tion in June of the same year. The remainder had received matricula-
tion standing prior to that date (the earliest matriculation being
granted in 1963). All students had graduated without the benefit of
high school supplemental examinations. Each student had also comple-
ted three years of university study. Each record was comprised of 31
variables; nine high school predictor variables and the following
university variables:

FIRST YEAR (1965-66)

(10) Accounting 200

(11) Business 202

(12) Economics 200

(13) English 210

(14) Arts or Science Option

(15) First Year Average

SECOND YEAR (1966-67)

(16) Business Law 310

(17) Psychology 202

(18) Business Statistics 308

(19) Business 320

(20) Computing Science 351

(21) Mathematics 243

(22) Arts or Science Option

(23) Second Year Average

THIRD YEAR (1967-68)

(24) Marketing 302

(25) Finance 302

(26) Business 302

(27) Production 302

(28) Business 355

(29) Industrial Relations 302

(30) Economics or Commerce Option

(31) Third Year Average

Sample Four

Sample four was drawn from those students who had entered the Faculty of Business Administration and Commerce at the University of Alberta as freshmen in September of 1964. Each student had completed four years of university study. Of the 50 students drawn for this sample, 26 had completed the requirements for high school matriculation in 1964. For the remainder, information as to date of high school completion was incomplete. A total of 36 variables comprised each record; nine high school variables and the following university variables:

FIRST YEAR (1964-65)

(10) Accounting 200   (13) English 210

(11) Business 202   (14) Arts or Science Option

(12) Economics 200   (15) First Year Average

SECOND YEAR (1965-66)

(16) Business Law 310

(17) Psychology 202

(18) Statistics 205

(19) Business Statistics 306

(20) Computing Science 351

(21) Business 320

(22) Philosophy or Arts or Science Option

(23) Second Year Average

THIRD YEAR (1966-67)

(24) Marketing 302

(25) Finance 302

(26) Production 302

(27) Business 355

(28) Personnel 302

(29) Economics or Commerce Option

(30) Third Year Average

FOURTH YEAR (1967-68)

(31) Business 400

(32) Arts or Science Option

(33) Economics or Commerce Option

(34) Economics or Commerce Option

(35) Economics or Commerce Option

(36) Fourth Year Average

Sample Five

Sample five was composed of those Commerce students who had entered the University of Alberta as freshmen in September of 1963. Each student had completed four years of University study. Of the thirty-nine students drawn for the sample, all had completed their matriculation requirements in June of 1963 without the need of supplemental examinations. Thirty-six variables comprised each student record. Variables employed are identical to those in sample four. Percentage grades comprised the first three years of university study

(1963-66), and grade-point the final year (1966-67).

Sample Six

This sample was comprised of those students who had matriculated from an Alberta high school and who had successfully completed the requirements for the Bachelor of Commerce degree at the University of Alberta prior to the 1966 change in grading systems. Students selected for this sample had entered the University of Alberta as freshmen in September of 1962 and had graduated with their Baccaleureate in 1966. All university grades, therefore, were indicated as percentages. Unfortunately, date of high school graduation and conditions with regard to supplemental examinations could not be held constant in this sample because of the necessity of maintaining at least a reasonable sample size.

A total of 47 student records were drawn for this catagory. Each record had a total of 35 variables; nine high school variables as illustrated in samples one and two, and the following university variables:

FIRST YEAR (1962-63)

(10) Accounting 200

(11) Business 202

(12) Economics 200

(13) English 210

(14) Arts or Science Option

(15) First Year Average

SECOND YEAR (1963-64)

(16) Business Law 310

(17) Psychology 202

(18) Statistics 354

(19) Business 320

(20) Philosophy or Arts or Science Option

(21) Second Year Average

THIRD YEAR (1964-65)	FOURTH YEAR (1965-66)

THIRD YEAR (1964-65)

(22) Marketing 302

(23) Finance 302

(24) Production 302

(25) Business 354

(26) Business 355

(27) Personnel 302

(28) Economics or Commerce Option

(29) Third Year Average

FOURTH YEAR (1965-66)

(30) Business 400

(31) Arts or Science Option

(32) Economics or Commerce Option

(33) Economics or Commerce Option

(34) Economics or Commerce Option

(35) Fourth Year Average

Statistical Analysis

All data was coded and transferred to special record sheets. Anonymity was maintained to insure the protection of confidential information. For each sample, intercorrelations of selected variables were computed and arranged in tabular form. The intercorrelation matrixs were derived by using the University of Alberta IBM 360 computer. Variables exhibiting a relatively high degree of intercorrelation were noted.

CHAPTER IV

RESULTS OF THE STUDY

Sample One

Table One presents the university freshman course requirements

for the 1967-68 winter session in the faculty of Business Administra-

tion and Commerce at the University of Alberta and, according to the

numerical value of the corresponding coefficients of correlation, the

best three Grade XII predictor variables associated with the univer-

sity criteria. It can be seen that the best three Grade XII predictor

variables associated with the university freshman average are Mathe-

matics 31, Chemistry 30, and Physics 30 with correlation coefficients

of .604, .468 and .444 respectively. Both Chemistry and Physics are

significant at the .01 level. Mathematics 31 is significant at the

.05 level. Generally speaking, Mathematics 31, Chemistry 30 and

Physics 30 are also predominantly high in predictive ability (relative

to the other Grade XII predictor variables) for all of the 1967-68

university freshman course requirements. The dominance of these three

Grade XII variables in being most closely associated with the 1967-68

freshman course requirements can be seen in Table A of the appendix,

which presents the correlation coefficients derived between all the

Grade XII predictor variables and freshman course requirements for

the 1967-68 term. The three Grade XII predictor variables which are

most closely associated with the university course criteria are marked

appropriately. It appears, therefore, that Mathematics 31, Chemistry 30

and Physics 30 were key Grade XII subject variables which correlated

TABLE I

SELECTED CORRELATIONS DERIVED FROM GRADE XII
PREDICTOR VARIABLES WITH INDIVIDUAL UNIVERSITY
COURSE MARKS AND FRESHMAN AVERAGE
(SAMPLE ONE, FRESHMAN YEAR 1967-68)

UNIVERSITY COURSE CRITERION	BEST SINGLE PREDICTOR			SECOND BEST SINGLE PREDICTOR			THIRD BEST SINGLE PREDICTOR		
	N	r	COURSE	N	r	COURSE	N	r	COURSE
Accounting 202	16	.570*	Mathematics 31	37	.446**	Physics 30	40	.400*	Chemistry 30
Business 202	43	.382*	Social Studies 30	11	.369	Biology 30	37	.355*	Physics 30
Economics 200	17	.557*	Mathematics 31	41	.515**	Chemistry 30	37	.492**	Physics 30
English 210	43	.285	Social Studies 30	43	.274	English 30	37	.257	Physics 30
Mathematics 240	17	.601*	Mathematics 31	37	.443**	Physics 30	41	.418**	Chemistry 30
Arts or Science Option	17	.540*	Mathematics 31	30	.274	Language 30	40	.260	Chemistry 30
Freshman $\overline{X}$	17	.604*	Mathematics 31	41	.468**	Chemistry 30	37	.444**	Physics 30

* Significant at .05 level of confidence
** Significant at .01 level of confidence

most closely with the over-all academic performance of those students

who had entered the Faculty of Business Administration and Commerce at

the University of Alberta as freshmen in September of 1967.

Sample Two

Table B (appendix) presents correlation coefficients between pre-
dictor variables and university course criteria for those students who

had entered the Faculty of Business Administration and Commerce as fresh-

men in the fall of 1966. Two years of university study were available

for examination in this sample.

Table II presents the 1966-67 freshman course requirements of

sample number two and the corresponding best three Grade XII predictor

variables according to the numerical value of the correlation coefficients

derived. It can be seen that Mathematics 31, Biology 30 and Physics 30

were the three Grade XII predictor variables which most closely associa-

ted with the average academic performance of freshmen students of that

year. The correlation coefficients derived were .907, .874 and .724

respectively. All three coefficients were significant at the .01 level.

Examination of Table B (appendix) shows that of all the Grade XII

predictor variables Mathematics 31, Biology 30 and Physics 30 were most

closely related to the university second year average performance as

well. It seems, therefore, that Mathematics 31, Biology 30 and Physics

30 were key Grade XII predictor variables for those students who had

entered the Faculty of Business Administration and Commerce at the

University of Alberta as Freshmen in September of 1966.

Table III presents the second year university course criteria of

sample number two and the corresponding best three predictor variables

as indicated by correlation coefficients shown in appendix Table B.

TABLE II

SELECTED CORRELATIONS DERIVED FROM GRADE XII
PREDICTOR VARIABLES+ WITH INDIVIDUAL UNIVERSITY
COURSE MARKS AND FRESHMAN AVERAGE
(SAMPLE TWO, FRESHMAN YEAR 1966-67)

UNIVERSITY COURSE CRITERION	BEST SINGLE PREDICTOR			SECOND BEST SINGLE PREDICTOR			THIRD BEST SINGLE PREDICTOR		
	N	r	SUBJECT	N	r	SUBJECT	N	r	SUBJECT
Accounting 202	10	.597	Mathematics 31	46	.381**	Social Studies 30	7	.331	Biology 30
Business 202	46	.427**	Social Studies 30	10	.377	Mathematics 31	46	.353*	Chemistry 30
Economics 200	41	.402**	Physics 30	46	.297*	Social Studies 30	46	.286	Mathematics 30
English 210	7	.330	Biology 30	46	.309*	Mathematics 30	46	.283	Social Studies 30
Mathematics 240	7	.672	Biology 30	46	.362*	Chemistry 30	46	.341*	Mathematics 30
Arts or Science Option	7	.361*	Physics 30	7	.312	Biology 30	46	.284	Chemistry 30
Freshman Average	10	.907**	Mathematics 31	8	.874**	Biology 30	41	.724**	Physics 30

+ University Subject Criteria do not include High School Average as a Predictor Variable

* Significant at .05 level of confidence
** Significant at .01 level of confidence

Although predictor variables involved subjects from both the Grade XII and freshman level, it can be seen that in each case the best three predictor variables for second year grades were freshman year results. Of these freshman results, there is a predominantly high occurrence of Accounting 202 and Business 202 as being most closely associated with the second year university course requirements.

In considering the second year university average performance, the best single predictor was found to be the freshman average grade (r=.855) which is significant at the .01 level. Numerically, the second and third highest correlation coefficients between the predictor variables and the second year average grade were Mathematics 31 and Biology 30 with coefficients of .755 and .738 respectively. Mathematics 31 and Biology, however, were significant only to the .05 level. To maintain a significance level of .01, Accounting 202 and Business 202 would be ranked second and third with coefficients of .703 and .692 respectively.

Therefore, for those students who had entered the Faculty of Business Administration and Commerce in the fall of 1966, key predictor variables of second year average performance were the freshman average grade, Accounting 202 and Business 202. It is also interesting to note that for these key freshman predictors, the best single Grade XII predictor is Mathematics 31 which ranks first in predicting the freshman average grade and Accounting 202, and second in predicting Business 202 (see appendix, Table B).

Sample Three

Appendix Table C presents correlation coefficients derived between predictor variable and university course criteria for those students

TABLE III

CORRELATIONS DERIVED FROM GRADE XII PREDICTOR VARIABLES AND UNIVERSITY FIRST YEAR PREDICTOR VARIABLES WITH INDIVIDUAL SECOND YEAR UNIVERSITY COURSE MARKS AND SECOND YEAR AVERAGE+ (SAMPLE TWO, SECOND YEAR UNIVERSITY, 1967-68)

UNIVERSITY COURSE CRITERION	BEST SINGLE PREDICTOR			SECOND BEST SINGLE PREDICTOR			THIRD BEST SINGLE PREDICTOR		
	N	r	COURSE	N	r	COURSE	N	r	COURSE
Business 310	46	.554**	Business 202	46	.518**	Accounting 202	46	.465**	Economics 200
Psychology 202	45	.569**	Business 202	45	.496**	Accounting 202	45	.454**	Arts or Science Option
Business Statistics 308	45	.632**	Accounting 202	45	.592**	Business 202	45	.548**	Economics 200
Business 320	46	.680**	Economics 200	46	.553**	Business 202	46	.532**	Accounting 202
Computing Science 351	44	.551**	Business 202	44	.519**	Accounting 202	44	.407**	Arts or Science Option
Accounting 204	46	.674**	Accounting 202	46	.639**	Business 202	46	.558**	Mathematics 240
Mathematics 243	45	.476**	Accounting 202	45	.431**	Mathematics 240	45	.325*	Business 202
Business 312	46	.555**	Accounting 202	46	.553**	Business 202	46	.505**	Economics 200
Arts or Science Option	43	.619**	Business 202	43	.523**	Accounting 202	43	.503**	English 210
UNIVERSITY SECOND YEAR AVERAGE	46	.855**	First Year University	10	.755*	Mathematics 31	8	.738*	Biology 30
				46	.703**	Accounting 202 (4th)	46	.692**	Business 202 (5th)

+ Predictor Variables for Second Year Course Marks do not include Average Grade for High School or First Year University Performance.

 * Significant at .05 level

** Significant at .01 level

who had entered the Faculty of Business Administration and Commerce at the University of Alberta in the fall of 1965. Three years of university study were available for examination.

Table IV presents the 1965 freshman year course requirements and the corresponding top three Grade XII predictor variables as indicated in appendix Table C by the numerical value of the correlation coefficients derived. The freshman year average mark correlated best with the high school average grade, the high school language requirement and the Mathematics 31 score. The coefficients of correlation were .443, .440 and .379 respectively. The high school average grade was significant at the .01 level and the language requirement was significant at .05. The Mathematics 31 score was not statistically significant.

Examination of appendix Table C further shows that of all the Grade XII predictor variables, the high school average grade and the high school language requirement were related relatively strongly to the university second year average performance as well. In this latter university year, the non-significant Mathematics 31 score lost its position amongst the best three Grade XII predictor variables to Physics 30. In predicting third year university average, the best three Grade XII predictions were Physics 30, Mathematics 30, and high school average. The Grade XII language requirement derived the fourth highest correlation coefficient with third year average.

It appears, therefore, that the high school average grade was a key Grade XII subject variable which correlated most closely with the average academic performance of those students who had entered the Faculty of Business Administration and Commerce at the University of

TABLE IV

SELECTED CORRELATIONS DERIVED BETWEEN
GRADE XII PREDICTOR VARIABLES AND INDIVIDUAL
UNIVERSITY COURSE MARKS AND FRESHMAN AVERAGE
(SAMPLE THREE, FRESHMAN YEAR, 1965-66)

UNIVERSITY COURSE CRITERION	BEST PREDICTOR			SECOND BEST PREDICTOR			THIRD BEST PREDICTOR		
	N	r	SUBJECT	N	r	SUBJECT	N	r	SUBJECT
Accounting 200	11	.599	Mathematics 31	40	.439**	High School $\overline{X}$	40	.420**	Mathematics 30
Business 202	11	.491	Mathematics 31	40	.289	High School $\overline{X}$	32	.260	Language 30
Economics 200	40	.343*	High School $\overline{X}$	32	.336	Language 30	11	.323	Mathematics 31
English 210	40	.408**	Chemistry 30	40	.388*	High School $\overline{X}$	32	.364	Language 30
Arts or Science Option	32	.380*	Language 30	40	.248	Mathematics 30	16	.212	Biology 30
FIRST YEAR AVERAGE	40	.443**	High School $\overline{X}$	32	.440*	Language 30	11	.379	Mathematics 31

* Significant at .05 level of confidence
** Significant at .01 level of confidence

Alberta as freshmen in September of 1965. As a key Grade XII predictor variable, the High School language requirement holds a weak second position when associated with the overall average academic performance in this sample. In predicting average freshman performance, the Mathematics 31 mark holds a weak third position.

Table V presents the second year university course criteria of sample number three and the corresponding best three predictor variables as indicated by correlation coefficients shown in appendix Table C. The best indicator of the second year average performance was the freshman average with a correlation coefficient of .660. The second and third best predictors of second year university average performance were Economics 200 (r=.572) and Accounting 200 (r=.556). All three predictor variables were significant at the .01 level. Following Accounting 200 in order of predictive strength was Business 202 (r=.486) which was also significant at the .01 level (see appendix Table C).

It is interesting to note here that although the predictor variables associated with the second year average grade involved variables from both the Grade XII and freshman level, the best indicators of second year average performance were freshman course results. Further, of all the freshman results, the freshman average and the Business 202 score were most closely related to the third year average performance as well (see appendix Table C). Therefore, for those students who had entered the Faculty of Business Administration and Commerce in the fall of 1965, the freshman average grade is a key first year predictor variable which is strongly associated with post freshman year results. Other freshman variables which tend to be relatively strongly associated with future academic performance are Accounting 202 and Business 202.

TABLE V

SELECTED CORRELATIONS DERIVED FROM GRADE XII
PREDICTOR VARIABLES AND UNIVERSITY FIRST YEAR
PREDICTOR VARIABLES WITH INDIVIDUAL SECOND YEAR
UNIVERSITY COURSE MARKS AND SECOND YEAR AVERAGE
(SAMPLE THREE, SECOND YEAR UNIVERSITY, 1966-67)

UNIVERSITY COURSE CRITERIA	BEST SINGLE PREDICTOR			SECOND BEST SINGLE PREDICTOR			THIRD BEST SINGLE PREDICTOR		
	N	r	SUBJECT	N	r	SUBJECT	N	r	SUBJECT
Business Law 310	40	.481**	Economics 200	40	.455**	Accounting 200	40	.425**	1st Year $\overline{X}$
Psychology 202	40	.488**	High School $\overline{X}$	40	.452**	Social Studies 30	40	.440**	Chemistry 30
Business Statistics 308	40	.639**	Accounting 200	40	.537**	1st Year $\overline{X}$	40	.442**	High School $\overline{X}$
Business 320	39	.608**	1st Year $\overline{X}$	39	.552**	Arts & Science Option	39	.471**	Business 202
Computing Science 351	39	.624**	1st Year $\overline{X}$	11	.569**	Mathematics 31	39	.515**	Accounting 200
Mathematics 243	32	.624**	Language 30	40	.407*	1st Year $\overline{X}$	40	.392*	High School $\overline{X}$
Arts or Science Option	40	.372*	Economics 200	40	.367	Accounting 200	16	.326	Biology 30
2nd Year $\overline{X}$	40	.660**	1st Year $\overline{X}$	40	.572**	Economics 200	40	.556**	Accounting 200

* Significant at .05 level of confidence
** Significant at .01 level of confidence

Further, it is also interesting to note that of all the Grade XII predictor variables, the high school average and the Mathematics 31 grade are most closely associated with these key freshman variables (see appendix Table C).

Table VI presents the third year business course criteria of sample number three and the corresponding best three predictor variables. It can be seen that the best single predictor of third year average is the second year average score (r=.711). The second and third best predictors of third year average are Business 320 (r=.640) and Computing Science 351 (r=.590). All three predictor variables are significant at the .01 level. Here too, the best three predictors of a university average score are all grades received during the immediately preceding year of study. Key indicators of future academic performance amongst the second year course requirements for this sample appear to be, therefore, the second year average grade, Business 320 and Computing Science 351. Further, examination of appendix Table C will show that each of the key second year predictor variables correlated best with the preceding freshman average grade which in turn correlated best with the high school average mark. Each variable's correlation coefficient in the above mentioned pattern is significant at the .01 level.

Sample Four

Table D (appendix) presents correlation coefficients derived from predictor variables and university course criteria for those students who had entered the business pattern at the University of Alberta in September of 1964. In this sample number four, four years of university study are available for examination.

TABLE VI

SELECTED CORRELATIONS DERIVED FROM GRADE XII
UNIVERSITY FIRST AND SECOND YEAR PREDICTOR VARIABLES WITH
INDIVIDUAL THIRD YEAR COURSE MARKS AND THIRD YEAR AVERAGE
(SAMPLE THREE, THIRD YEAR UNIVERSITY, 1967-68)

UNIVERSITY COURSE CRITERIA	BEST SINGLE PREDICTOR			SECOND BEST SINGLE PREDICTOR			THIRD BEST SINGLE PREDICTOR		
	N	r	SUBJECT	N	r	SUBJECT	N	r	SUBJECT
Marketing 302	38	.301	Business 202	37	.282	Business 320	38	.202	2nd Year $\overline{X}$
Finance 302	38	.657**	2nd Year $\overline{X}$	37	.650**	Computing 351 Science	11	.407	Business 320
Business 302	11	.571	Economics 200	11	.552	English 30	11	.499	Arts or Science Option
Production 302	27	.638**	1st Year $\overline{X}$	27	.612**	Arts or Science Option	27	.608**	2nd Year $\overline{X}$
Business 355	35	.639**	Computing 351 Science	36	.639**	2nd Year $\overline{X}$	36	.545**	Mathematics 30
Industrial Relations 302	37	.627**	Business Law 310	37	.574**	2nd Year $\overline{X}$	36	.489**	Computing 351 Science
Economics or Commerce Option	36	.647**	Business 320	37	.562**	2nd Year $\overline{X}$	37	.433**	Business Law 310
THIRD YEAR $\overline{X}$	38	.711**	2nd Year $\overline{X}$	37	.640**	Business 320	37	.590**	Computing 351 Science

* Significant at .05 level of confidence
** Significant at .01 level of confidence

Table VII presents the 1964 freshman year course requirements and the corresponding best three Grade XII predictor variables as indicated by the correlation coefficients shown in appendix Table D. It can be seen that the best three predictors of the freshman average grade for this sample of students were the high school average mark, Mathematics 31 and Biology 30. Correlation coefficients derived were .954, .941 and .927 respectively. All three coefficients were significant at the .01 level.

Examination of Table D (appendix) further shows that of all the possible Grade XII predictor variables the high school average, Mathematics 31 and Biology 30 were most closely related to the university second, third and fourth year average as well. The high school average, Mathematics 31 and Biology 30, therefore, were key Grade XII predictor variables for those students who had entered the Faculty of Business Administration and Commerce at the University of Alberta as Freshmen in September of 1964.

Table VIII presents the second year university course criteria of sample number four and the corresponding best three predictor variables as indicated by correlation coefficients exhibited in appendix Table D. The best three predictor variables for the second year average grade were found to be Biology 30, ($r=.950$), freshman average ($r=.946$) and the high school average ($r=.937$). The above coefficients were significant at the .01 level. The fourth best predictor of second year average was Mathematics 31 ($r=.911$) which was also significant at the .01 level. Therefore, for this sample, the three key Grade XII predictor variables (with the exception of freshman average) are more closely associated with the second year average performance than are

TABLE VII

SELECTED CORRELATIONS DERIVED FROM GRADE XII
PREDICTOR VARIABLES WITH INDIVIDUAL UNIVERSITY
COURSE MARKS AND FRESHMAN AVERAGE
(SAMPLE FOUR, FRESHMAN YEAR, 1964-65)

UNIVERSITY COURSE CRITERIA	BEST PREDICTOR			SECOND BEST PREDICTOR			THIRD BEST PREDICTOR		
	N	SUBJECT	r	N	SUBJECT	r	N	SUBJECT	r
Accounting 200	19	Mathematics 31	.908**	49	High School $\bar{X}$	.887**	50	Mathematics 30	.860**
Business 202	18	Biology 30	.965**	19	Mathematics 31	.934**	49	High School $\bar{X}$	.931**
Economics 200	19	Mathematics 31	.880**	18	Biology 30	.874**	49	High School $\bar{X}$	.818**
English 210	19	Mathematics 31	.921**	18	Biology 30	.917**	49	High School $\bar{X}$	.861**
Arts or Science Option	19	Mathematics 31	.925**	49	High School $\bar{X}$	.870**	18	Biology 30	.860**
1st Year $\bar{X}$	49	High School $\bar{X}$	.954**	19	Mathematics 31	.941**	18	Biology 30	.927**

* Significant at .05 level of confidence
** Significant at .01 level of confidence

the freshman year results. However, if the freshman results alone are associated with the second year average performance (see appendix Table D), the freshman average, Accounting 200 and Business 202 derive the highest three correlation coefficients. The correlation coefficients derived were .946, .906 and .899 respectively. These latter coefficients were also significant at the .01 level. Further, with the exception of Accounting 200 losing its position to English 210 when correlated with the fourth year average grade, the freshman average, Accounting 200 and Business 202 were more closely associated with the third and fourth year average performance, than any of the other first year course require-ments. It appears, therefore, that of all the first year course require-ments, in this sample, the first year average, Accounting 200 and Business 202 were key predictors of future academic performance for those students who had entered the Faculty of Business Administration and Commerce in the fall of 1964.

Table IX presents the third year university course criteria for sample number four and the corresponding best three predictor variables as indicated by the correlation coefficients shown in appendix Table D. Subject variables most closely associated with the third year average grade were Biology 30 ($r=.936$) second year average ($r=.906$) and Mathematics 31 ($r=.883$). All three coefficients were significant at the .01 level. Here again, with the exception of the previous year's average performance, Biology 30 and Mathematics 31 tend to be key predictor variables of future academic performance. However, if the second year variables alone are correlated with the third year average performance, the second year average, Statistics 205 ($r=.861$) and Psychology 202 ($r=.857$) correlate most closely. All correlation

TABLE VIII

SELECTED CORRELATIONS DERIVED FROM GRADE XII
PREDICTOR VARIABLES AND UNIVERSITY FIRST YEAR PREDICTOR VARIABLES
WITH INDIVIDUAL SECOND YEAR UNIVERSITY COURSE MARKS AND SECOND YEAR AVERAGE
(SAMPLE FOUR, SECOND YEAR UNIVERSITY, 1965-66)

UNIVERSITY COURSE CRITERIA	BEST PREDICTOR			SECOND BEST PREDICTOR			THIRD BEST PREDICTOR		
	N	r	SUBJECT	N	r	SUBJECT	N	r	SUBJECT
Business Law 310	18	.927**	Biology 30	18	.918**	Mathematics 31	49	.911**	High School $\bar{X}$
Psychology 202	18	.946**	Biology 30	50	.896**	Business 202	50	.894**	1st Year $\bar{X}$
Statistics 205	18	.883**	Biology 30	50	.879**	Accounting 200	50	.877**	1st Year $\bar{X}$
Business Statistics 306	18	.898**	Biology 30	19	.884**	Mathematics 31	50	.857**	Accounting 200
Business 320	18	.912**	Biology 30	19	.855**	Mathematics 31	50	.807**	1st year $\bar{X}$
Computing Science 351	50	.893**	Accounting 200	18	.892**	Biology 30	50	.831**	1st year $\bar{X}$
Arts or Science Option	18	.905**	Biology 30	19	.864**	Mathematics 31	50	.842**	1st year $\bar{X}$
2nd Year $\bar{X}$	18	.950**	Biology 30	50	.946**	1st Year $\bar{X}$	49	.937**	High School $\bar{X}$

* Significant at .05 level of confidence
** Significant at .01 level of confidence

coefficients are significant at the .01 level. Further, of all second
year predictor variables, the second year average, Statistics 205 and
Psychology 202 are most closely associated with the fourth year average
performance as well (see appendix Table D). It appears, therefore,
that for those students who had entered the Faculty of Business Adminis-
tration and Commerce in the fall of 1964, key second year predictor
variables were the second year average grade, Statistics 205 and
Psychology 202.

Table X presents a fourth year subject variable (Business 400)
and the fourth year average grade as university course criteria to be
associated with the predictor variables of sample number four. The
other three course requirements of the fourth year business pattern
were not included in this table as all were optional subjects and con-
sequently varied from student to student. The best three predictor
variables for the university fourth year average were Biology 30($r=910$),
second year average ($r=.894$) and Mathematics 31 ($r=.883$). The third
year average grade ranked sixth as a predictor variable for the fourth
year average score with a correlation coefficient of .869. All the
above coefficients are significant at the .01 level. Of the third
year variables alone, the best three indicators of fourth year average
performance for this sample are the third year average grade, Finance
302 ($r=.812$) and Production 302 ($r=.811$). The correlation coefficients
for the above three third year variables are also significant at the
.01 level.

TABLE IX

SELECTED CORRELATIONS DERIVED FROM GRADE XII

UNIVERSITY FIRST AND SECOND YEAR PREDICTOR VARIABLES WITH INDIVIDUAL

THIRD YEAR COURSE MARKS AND THIRD YEAR AVERAGE

(SAMPLE FOUR, THIRD YEAR UNIVERSITY, 1966-67)

UNIVERSITY COURSE CRITERIA	BEST PREDICTOR			SECOND BEST PREDICTOR			THIRD BEST PREDICTOR		
	N	r	SUBJECT	N	r	SUBJECT	N	r	SUBJECT
Marketing 302	18	.884**	Biology 30	19	.759**	Mathematics 31	49	.755**	Business 320
Finance 302	48	.856**	Computing 351	50	.838**	2nd year $\overline{X}$	18	.826**	Biology 30
Production 302	18	.854**	Biology 30	50	.811**	2nd year $\overline{X}$	19	.803**	Mathematics 31
Business 355	50	.730**	B.Statistics 306	50	.705**	Statistics 205	50	.684**	2nd year $\overline{X}$
Personnel 302	18	.898**	Biology 30	19	.811**	Mathematics 31	49	.735**	Psychology 202
Economics or Commerce Option	19	.878**	Mathematics 31	18	.875**	Biology 30	50	.765**	Business 202
3rd Year $\overline{X}$	18	.936**	Biology 30	50	.906**	2nd Year $\overline{X}$	18	.883**	Mathematics 31

* Significant at .05 level of confidence
** Significant at .01 level of confidence

TABLE X

SELECTED CORRELATIONS DERIVED FROM GRADE XII
UNIVERSITY FIRST, SECOND AND THIRD YEAR PREDICTOR VARIABLES
WITH BUSINESS 400 AND FOURTH YEAR AVERAGE
(SAMPLE FOUR, FOURTH YEAR UNIVERSITY, 1967-68)

UNIVERSITY COURSE CRITERIA	BEST PREDICTOR			SECOND BEST PREDICTOR			THIRD BEST PREDICTOR		
	N	r	SUBJECT	N	r	SUBJECT	N	r	SUBJECT
Business 400	19	.832**	Mathematics 31	18	.828**	Biology 30	50	.753**	Psychology 202
4th Year $\overline{X}$	18	.910**	Biology 30	48	.894**	2nd Year $\overline{X}$	19	.883**	Mathematics 31

* Significant at .05 level of confidence
** Significant at .01 level of confidence

Sample Five

Table E (appendix) exhibits correlation coefficients derived between the predictor variables and the university course criteria for those students who had entered the Faculty of Business Administration and Commerce as freshman in the fall of 1963. In this sample, four years of university study are available for examination.

Table XI presents the 1963 freshman year course criteria and the corresponding best three Grade XII predictor variables as indicated by the correlation coefficients shown in appendix Table E. The best three predictors of the freshman average grade for this sample of students were found to be the high school average mark, Chemistry 30 and the language requirement. Correlation coefficients derived were .668, .637 and .472 respectively. All three coefficients were significant at the .01 level of confidence.

Examination of appendix Table E also shows that of all the Grade XII predictor variables, the high school average grade occurred most often as one of the best three predictors of future university business marks. Following the high school average grades Chemistry 30 and Biology 30 ranked second and third respectively. The third best Grade XII predictor of university first year average (Language 30) did not appear as one of the best three high school predictors of either second, third or fourth university business criteria. Therefore, the high school average grade, Chemistry 30 and Biology 30 appear to be the key Grade XII predictor variables for this sample.

Table XII presents the second year university course criteria of sample number five and the corresponding best three predictor variables

TABLE XI

SELECTED CORRELATIONS DERIVED FROM GRADE XII UNIVERSITY
FIRST AND SECOND YEAR PREDICTOR VARIABLES WITH INDIVIDUAL
THIRD YEAR COURSE MARKS AND THIRD YEAR AVERAGE
(SAMPLE FIVE, FRESHMAN YEAR, 1963-64)

UNIVERSITY COURSE CRITERIA	BEST PREDICTOR			SECOND BEST PREDICTOR			THIRD BEST PREDICTOR		
	N	r	SUBJECT	N	r	SUBJECT	N	r	SUBJECT
Accounting 200	39	.612**	High School $\overline{X}$	36	.581**	Chemistry 30	18	.488**	Biology 30
Business 202	39	.605***	High School $\overline{X}$	18	.588*	Biology 30	36	.530***	Chemistry 30
Economics 200	36	.521**	Chemistry 30	39	.438**	High School $\overline{X}$	18	.390	Biology 30
English 210	39	.371*	High School $\overline{X}$	36	.370*	Chemistry 30	39	.368*	English 30
Arts or Science Option	39	.538**	High School $\overline{X}$	36	.495**	Chemistry 30	27	.437	Physics 30
FIRST YEAR AVERAGE	39	.668**	High School $\overline{X}$	36	.637**	Chemistry 30	34	.472**	Language 30

* Significant at .05 level of confidence
** Significant at .01 level of confidence

TABLE XII

SELECTED CORRELATIONS DERIVED FROM GRADE XII
PREDICTOR VARIABLES AND UNIVERSITY FIRST YEAR PREDICTOR VARIABLES
WITH INDIVIDUAL SECOND YEAR UNIVERSITY COURSE MARKS AND SECOND YEAR AVERAGE
(SAMPLE FIVE, SECOND YEAR UNIVERSITY, 1964-65)

UNIVERSITY COURSE CRITERIA	BEST PREDICTOR			SECOND BEST PREDICTOR			THIRD BEST PREDICTOR		
	N	r	SUBJECT	N	r	SUBJECT	N	r	SUBJECT
Business Law 310	39	.690**	Accounting 200	39	.660**	1st year $\overline{X}$	39	.653**	High School $\overline{X}$
Psychology 202	38	.719**	Accounting 200	38	.701**	1st year $\overline{X}$	38	.670**	High School $\overline{X}$
Statistics 205	39	.567**	1st year $\overline{X}$	39	.563**	Accounting 200	39	.504**	High School $\overline{X}$
Business Statistics 306	39	.528**	Accounting 200	39	.521**	High School $\overline{X}$	39	.515**	1st year $\overline{X}$
Business 320	39	.727**	Accounting 200	39	.726**	1st year $\overline{X}$	36	.712**	Chemistry 30
Computing Science 351	36	.722**	Chemistry 30	39	.601**	High School $\overline{X}$	39	.590**	Accounting 200
Arts or Science Option	38	.589**	High School $\overline{X}$	38	.573**	1st year $\overline{X}$	35	.560**	Chemistry 30
2nd Year $\overline{X}$	36	.786**	Chemistry 30	39	.774**	1st year $\overline{X}$	39	.767**	Accounting 200

* Significant at .05 level of confidence
** Significant at .01 level of confidence

as indicated by correlation coefficients exhibited in appendix Table E.

The best three predictors of the second year average grade were found

to be Chemistry 30 (r=.786) first year average (r=.774) and Accounting

200 (r=.767). All three coefficients were significant at the .01 level

of confidence. Of the freshman results alone, the freshman average,

Accounting 200 and Business 202 (r=.702) were most closely correlated

with the second year average performance. Further, with the exception

of Accounting 200 ranking fourth best in predicting the fourth year

average grade, the freshman average, Accounting 200 and Business 202

correlated most closely with third and fourth year average performance

as well. Therefore, of the first year course requirements, the first

year average, Accounting 200 and Business 202 appear to be key fresh-

man predictors of second, third and fourth year academic performance

for those students who had entered the Faculty of Business Administration

and Commerce in September 1963.

Table XIII exhibits the third year university course criteria for

sample number five and the corresponding best three predictors as

indicated by the correlation coefficients presented in appendix Table E.

Predictor variables most closely associated with the third year average

grade were second year average (r=.787), Business 320 (r=.783) and

Psychology 202 (r=.753). All three coefficients were found to be

significant at the .01 level of confidence.

In correlating the university second year predictor variables with

the fourth year average grade, the three best second year predictors

were Business 320, Business Law 310 and the second year average.

Psychology 202 dropped down to a fourth best position (see appendix,

Table E). Notwithstanding, in predicting each individual course

TABLE XIII

SELECTED CORRELATIONS DERIVED FROM GRADE XII
UNIVERSITY FIRST AND SECOND YEAR PREDICTOR VARIABLES WITH INDIVIDUAL
THIRD YEAR COURSE MARKS AND THIRD YEAR AVERAGE
(SAMPLE FIVE, THIRD YEAR UNIVERSITY, 1965-66)

UNIVERSITY COURSE CRITERIA	BEST PREDICTOR			SECOND BEST PREDICTOR			THIRD BEST PREDICTOR		
	N	r	SUBJECT	N	r	SUBJECT	N	r	SUBJECT
Marketing 302	39	.577**	Business Law 310	39	.573**	Business 320	39	.553**	High School $\overline{X}$
Finance 302	39	.670**	Business 320	39	.639**	2nd year $\overline{X}$	39	.628**	1st year $\overline{X}$
Production 302	39	.802**	2nd year $\overline{X}$	39	.760**	Business 320	38	.743**	Psychology 202
Business 355	38	.787**	2nd year $\overline{X}$	37	.729**	Psychology 202	17	.723**	Biology 30
Personnel 302	39	.395*	Business Law 310	18	.365	Biology 30	38	.280	Psychology 202
Economics or Commerce Option	37	.568**	Business 320	34	.473**	Chemistry 30	36	.436**	Psychology 202
3rd year $\overline{X}$	39	.787**	2nd year $\overline{X}$	39	.783**	Business 320	38	.753**	Psychology 202

* Significant at .05 level of confidence
** Significant at .01 level of confidence

criterion of third and fourth year business study, Business 320,

second year average and Psychology 202 rank most often amongst the

best three second year predictors.   They appear, therefore as key

second year course requirements.

Table XIV presents Business 400 and the fourth year average

grade as university course criteria.   As in sample number four, the

variability of optional fourth year subjects prevented their inclusion

as university course criteria.   The best three predictors of the

university fourth year average grade were Marketing 302 (r=.597)

Business 320 (r=.587) and third year average (r=.572).   All three

coefficients are significant at the .01 level of confidence.   Of

the third year variables alone, the best three predictors of univer-

sity were Marketing 302, Finance 302 (r=.562) and the third year

average grade (see appendix, Table E).   Coefficients derived between

these best three third year predictor variables and the university

fourth year average performance were significant at the .01 level of

confidence.

TABLE XIV
SELECTED CORRELATIONS DERIVED FROM GRADE XII
UNIVERSITY FIRST, SECOND AND THIRD YEAR PREDICTOR VARIABLES
WITH BUSINESS 400 AND FOURTH YEAR AVERAGE
(SAMPLE FIVE, FOURTH YEAR UNIVERSITY, 1966-67)

UNIVERSITY COURSE CRITERIA		N	r	SUBJECT
Business 400	Best Predictor	39	.537**	Marketing 302
	Second Best Predictor	39	.434**	Finance 302
	Third Best Predictor	39	.423**	Third year X̄
4th year X̄	Best Predictor	39	.597**	Marketing 302
	Second Best Predictor	39	.587**	Business 320
	Third Best Predictor	39	.572**	Third X̄

 * Significant at .05 level of confidence
** Significant at .01 level of confidence

Sample Six

Appendix Table F presents the correlation coefficients between the predictor variables and the university course criteria for those students who had entered the Faculty of Business Administration and Commerce as freshman in the fall of 1962. In this sample, four years of university study are available for examination.

Table XV presents the university freshman year course criteria and the best three high school predictor variables as indicated by the correlation coefficients exhibited in appendix Table F. In this sample, the best indicator of the freshman average grade was found to be Mathematics 31 (r=.941) which is significant at the .01 level. Numerically, Social Studies 30 and Biology 30 rank second and third respectively, but the correlation coefficients derived between these latter two Grade XII subjects and the freshman average were not statistically significant. However, if one examines the relationships between the Grade XII predictor variables and each of the individual freshman year course requirements, it appears that the three key Grade XII variables which correlate best with the over-all academic first year performance are Mathematics 31, Biology 30 and the high school average score. With one exception (English 30 ranking third best when correlated with English 210) Mathematics 31, Biology 30 and the high school average correlated best with each of the freshman course requirements in this sample. Further, correlation coefficients derived between Mathematics 31, Biology 30 and high school average and the freshman course requirements were, in each case, statistically significant at the .01 level.

Examination of Table F (appendix) also shows that of all the Grade XII predictor variables Mathematics 31, Biology 30 and the high

TABLE XV

SELECTED CORRELATIONS DERIVED FROM GRADE XII PREDICTOR
VARIABLES WITH INDIVIDUAL UNIVERSITY COURSE MARKS AND
FRESHMAN AVERAGE (SAMPLE SIX, FRESHMAN YEAR, 1962-63)

UNIVERSITY COURSE CRITERIA	BEST SINGLE PREDICTOR			SECOND BEST PREDICTOR			THIRD BEST PREDICTOR		
	N	r	SUBJECT	N	r	SUBJECT	N	r	SUBJECT
Accounting 200	12	.924***	Mathematics 31	16	.909**	Biology 30	47	.824***	High School $\overline{X}$
Business 202	16	.889***	Biology 30	12	.858***	Mathematics 31	47	.797***	High School $\overline{X}$
Economics 200	16	.920***	Biology 30	12	.904**	Mathematics 31	47	.788***	High School $\overline{X}$
English 210	16	.911**	Biology 30	12	.856**	Mathematics 31	47	.799***	English 30
Arts or Science Option	16	.892***	Biology 30	12	.813**	Mathematics 31	47	.657***	High School $\overline{X}$
FIRST YEAR AVERAGE	12	.941**	Mathematics 31	47	.136	Social Studies 30	16	.048	Biology 30

* Significant at .05 level of confidence
** Significant at .01 level of confidence

school average correlated best with second, third and fourth year average

grades as well. Therefore, of all the Grade XII predictor variables,

the Mathematics 31 score, Biology 30 and the high school average mark

were key indicators of future academic performance for those students

who had entered the Faculty of Business Administration and Commerce in

the fall of 1962.

Table XVI presents the second year university course requirements

of sample number six and the corresponding best three predictor vari-

ables as indicated by correlation coefficients shown in appendix

Table F. For this sample, predictor variables which correlated best

with the second year average grade were Mathematics 31 ($r=.941$), high

school average ($r=.877$) and Biology 30 ($r=.876$). All three Grade XII

predictor variables were significant at the .01 level. In this sample,

it is also interesting to note that the Mathematics 31 score, Biology 30

and the high school average grade all rank predominantly high when

correlated with each individual second year course requirement as well.

When correlating the second year average grade with the freshman

variables alone, Table F (appendix) indicates that the best three

freshman variables were Accounting 200 ($r=.827$), Business 202 ($r=.752$)

and Economics 200 ($r=.742$). All three first year variables derived

correlation coefficients which were significant at the .01 level.

Further, with the exception of Economics 200 being replaced by English

210 when the freshman scores were correlated with the fourth year

average grade, Accounting 200, Business 202 and Economics 200 corre-

lated best with third and fourth year average grades as well (see

appendix Table F). Therefore, of all freshman scores in this sample,

Accounting 200, Business 202, and Economics 200 appear to be key.

TABLE XVI

SELECTED CORRELATIONS DERIVED FROM GRADE XII PREDICTOR
VARIABLES AND UNIVERSITY FIRST YEAR PREDICTOR VARIABLES
WITH INDIVIDUAL SECOND YEAR COURSE MARKS AND SECOND YEAR AVERAGE
(SAMPLE SIX, SECOND YEAR UNIVERSITY, 1963-64)

UNIVERSITY COURSE CRITERIA	BEST SINGLE PREDICTOR			SECOND BEST PREDICTOR			THIRD BEST PREDICTOR		
	N	r	SUBJECT	N	r	SUBJECT	N	r	SUBJECT
Business Law 310	12	.903**	Mathematics 31	16	.857**	Biology 30	47	.824**	High School $\bar{X}$
Psychology 202	12	.944**	Mathematics 31	16	.828**	Biology 30	47	.809**	Business 202
Statistics 354	11	.920**	Mathematics 31	35	.834**	Physics 30	46	.823**	High School $\bar{X}$
Business 320	12	.909**	Mathematics 31	16	.802**	Biology 30	47	.790**	Accounting 200
Arts or Science Option	12	.917**	Mathematics 31	16	.849**	Biology 30	47	.783**	High School $\bar{X}$
SECOND YEAR AVERAGE	12	.941**	Mathematics 31	47	.877**	High School $\bar{X}$	16	.876**	Biology 30

*Significant at .05 level of confidence
**Significant at .01 level of confidence

freshman courses that best indicate future academic performance at the senior level.

Table XVII presents the third year university course requirements of sample number six and the best three predictor variables indicated by the correlation coefficients shown in appendix Table F. The best indicator of the third year average score was found to be the second year university average mark (r=.943). Mathematics 31 (r=.903) and Biology 30 (r=.895) were found to be the second and third best indicators of the third year average performance. All three coefficients were significant at the .01 level.

Amongst the second year variables alone, the best indicators of third year average performance were the second year average (r=.943), Business Law 310 (r=.887) and Business 320 (r=.869) (see appendix Table F). All three second year predictor variables were significant at the .01 level. Further, examination of appendix Table F shows that of all second year predictor variables, Business Law 310 and the second year average grade related most closely to the fourth year average performance as well. When comparing correlation coefficients between the second year variables and the fourth year average grade, Business 320's third position was replaced by Psychology 202. Therefore, for this sample, it appears that the second year average grade and Business Law 310 were key second year predictor variables which correlated best with third and fourth year university average performance.

Table XVIII presents the fourth year subject variable (Business 400) and the fourth year average grade as the fourth year university course criteria to be associated with the predictor variables of sample number six. Here again, optional course requirements for the fourth year

TABLE XVII

SELECTED CORRELATIONS DERIVED FROM GRADE XII UNIVERSITY
FIRST AND SECOND YEAR PREDICTOR VARIABLES WITH INDIVIDUAL
THIRD YEAR COURSE MARKS AND THIRD YEAR AVERAGE
(SAMPLE SIX, THIRD YEAR UNIVERSITY, 1964-65)

UNIVERSITY COURSE CRITERIA	BEST PREDICTOR			SECOND BEST PREDICTOR			THIRD BEST PREDICTOR		
	N	r	SUBJECT	N	r	SUBJECT	N	r	SUBJECT
Marketing 302	47	.918**	2nd Year $\overline{X}$	12	.902**	Mathematics 31	47	.896**	Business Law 310
Finance 302	12	.898**	Mathematics 31	47	.881**	High School $\overline{X}$	47	.863**	2nd Year $\overline{X}$
Production 302	12	.909**	Mathematics 31	47	.867**	2nd Year $\overline{X}$	16	.866**	Biology 30
Business 354	9	.988*	Statistics 354	3	.984	Biology 30	10	.967**	2nd Year $\overline{X}$
Business 355	5	.925	Mathematics 31	38	.754**	Statistics 354	38	.749**	2nd Year $\overline{X}$
Personnel 302	47	.876**	2nd Year $\overline{X}$	12	.876**	Mathematics 31	16	.875**	Biology 30
Economics or Commerce Option	16	.862**	Biology 30	47	.776**	Accounting 200	47	.774**	2nd Year $\overline{X}$
THIRD YEAR AVERAGE	47	.943**	2nd Year $\overline{X}$	12	.903**	Mathematics 31	16	.895**	Biology 30

* Significant at .05 level of confidence
** Significant at .01 level of confidence

TABLE XVIII

SELECTED CORRELATIONS DERIVED FROM GRADE XII,
UNIVERSITY FIRST, SECOND AND THIRD YEAR PREDICTOR
VARIABLES WITH BUSINESS 400 AND FOURTH YEAR AVERAGE
(SAMPLE SIX, FOURTH YEAR UNIVERSITY, 1965-66)

UNIVERSITY COURSE CRITERIA	BEST PREDICTOR			SECOND BEST PREDICTOR			THIRD BEST PREDICTOR		
	N	r	SUBJECT	N	r	SUBJECT	N	r	SUBJECT
Business 400	12	.895**	Mathematics 31	47	.873**	Production 302	16	.866**	Biology 30
FOURTH YEAR AVERAGE	47	.937**	3rd Year $\overline{X}$	47	.922**	2nd Year $\overline{X}$	10	.899**	Business 354

* Significant at .05 level of confidence
** Significant at .01 level of confidence

business pattern were not included in this table because of the varia-
tion of the subject choices from student to student. The best three
predictor variables for the university fourth year average were the
third year average (r=.937), the second year average (r=.922) and
Business 354 (r=.899). All three coefficients were significant at the
.01 level.

Of the third year variables alone, the best three indicators of
fourth year average performance for this sample were the third year
average grade (r=.937) Business 354 (r=.921) and Production 302 (r=.899)
(see appendix Table F). All three third year coefficients were signifi-
cant at the .01 level.

CHAPTER V

SUMMARY AND CONCLUSION

In predicting successful academic performance in the Faculty of Business Administration and Commerce at the University of Alberta, the results of this study seem to indicate that, amongst the course requirements of each individual year of academic study, certain key subject variables repeatedly tend to correlate more closely with the average academic performance of a higher level of university study. Further, although key predictor variables can be found in each successive year of study, those key variables taken from the most recently completed year, tend to be more closely correlated to the average academic performance of any future year.

As indicated by the results of this study, Table XIX presents those subject variables identified as key predictor variables for each sample drawn over the six year period under examination. Here, it is interesting to note that, excluding the average grade as a predictor variable, all key Grade XII course requirements for each sample (with the exception of Language 30 in sample number three) were quantitatively oriented. This finding may indicate that those students who are quantitatively inclined may, on the average, do better in a business program than those students who are not so inclined.

Of all the Grade XII predictor variables, it can be seen that the Mathematics 31 course requirement identifies itself most often as being a key indicator of future academic performance in the Faculty of Business Administration and Commerce at the University of Alberta. After Mathematics 31, the high school average, Biology 30 and Physics 30

TABLE XIX

KEY PREDICTOR VARIABLES AS
INDICATED BY THE RESULTS OF THE STUDY

SAMPLE NUMBER AND DATE OF FRESHMAN ENTRY TO UNIVERSITY	GRADE XII	FIRST YEAR UNIVERSITY	SECOND YEAR UNIVERSITY	THIRD YEAR UNIVERSITY
Sample One 1967	Mathematics 31 Chemistry 30 Physics 30			
Sample Two 1966	Mathematics 31 Biology 30 Physics 30	First year $\overline{X}$ Accounting 202 Business 202		
Sample Three 1965	High School $\overline{X}$ Language 30 Mathematics 31	First year $\overline{X}$ Accounting 200 Business 202	Second year $\overline{X}$ Business 320 Computing 351	
Sample Four 1964	High School $\overline{X}$ Mathematics 31 Biology 30	First year $\overline{X}$ Accounting 200 Business 202	Second year $\overline{X}$ Statistics 205 Psychology 202	Third year $\overline{X}$ Finance 302 Production 302
Sample Five 1963	High School $\overline{X}$ Chemistry 30 Biology 30	First year $\overline{X}$ Accounting 200 Business 202	Second year $\overline{X}$ Business 320 Psychology 202	Third year $\overline{X}$ Marketing 302 Finance 302
Sample Six 1962	Mathematics 31 Biology 30 High School $\overline{X}$	Accounting 200 Business 202 Economics 200	Second year $\overline{X}$ Business Law 310 Business 320	Third year $\overline{X}$ Business 354 Production 302

were most often associated with the future academic performance in the business pattern.

Unfortunately, for the Faculty of Business Administration and Commerce, not one of the key Grade XII predictor variables identified in this study are compulsory course requirements at the matriculation level. The Mathematics 31 grade, in fact, seems least often included in a freshman student's high school record. Practical reasons, therefore, dictate that for business students the seemingly best single Grade XII predictor of future academic performance (Mathematics 31) be de-emphasized for prediction purposes in favour of a key Grade XII predictor variable which would provide a more complete sampling distribution. Prior to September of 1966, the most practical Grade XII predictor of university business school performance appears to have been the high school average grade. This finding is in accord with the previous findings of other predictor studies done at the University of Alberta. Since September of 1966, however, Physics 30 appears to have been the most practical Grade XII predictor variable which could have been used for prediction purposes.

Of the freshman year course criteria, the results of this study suggest that the first year average grade, Accounting 202 (200) and Business 202 best indicate the average performance of future business study. However, even though all three of the above criteria are compulsory first year course requirements, the first year average grade remains the best single freshman year predictor variable as it predominantly derived higher correlation coefficients when associated with performance of a higher university level than either of the Accounting or Business 202 scores.

Of the key second year university course criteria, this study indicates that only the second year average consistently correlated best with a higher level of university study in business. Although other second year variables were closely associated with the second year average grade in predicting future academic performance in the business pattern, over the period under consideration in this study, these other second year course criteria varied from sample to sample.

Of the third year predictor variables, the third year average grade, Finance 302 and Production 302 occurred most often as key predictor variables which correlated most closely with the academic performance of the final year of study in the Faculty of Business Administration and Commerce at the University of Alberta. Of the two, the third year average grade consistently derived higher correlation coefficients when associated with the university fourth year average grade.

It generally appears, therefore, that with the exception of Physics 30 being the best over-all indication of future first year academic performance in the Faculty of Business Administration and Commerce in samples number one and two, the average grade received at any particular level of higher education considered in the study is, practically speaking, the best single indication of the average academic performance for the year to immediately follow. Although a particular subject variable may derive a coefficient of correlation which is numerically higher than the coefficient derived from the average grade of the immediately preceding year of academic study, the latter variable will still generally prove to be one of the best three indicators of future academic performance available. Therefore, for reasons of consistency and availability, the average grade of the

immediately preceding year of academic study remains, for the Faculty

of Business Administration and Commerce at the University of Alberta,

the best single predictor of academic performance for any higher

level of university education.

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APPENDIX

TABLE A

INTERCORRELATIONS+ OF PREDICTORS
AND UNIVERSITY CRITERIA, SAMPLE ONE

	UNIVERSITY CRITERIA						
	Accounting 202	Business 202	Economics 200	English 210	Mathematics 240	Arts or Science Option	1st Year Average
English 30	.205	.329	.363	<u>.274</u>	.075	.206	.348
Social Studies 30	.342	<u>.382</u>	.372	.285	.270	.145	.382
Mathematics 30	.214	-.039	.208	-.095	.404	-.120	.096
Chemistry 30	<u>.400</u>	.331	<u>.515</u>	.209	<u>.418</u>	<u>.260</u>	<u>.468</u>
Physics 30	<u>.446</u>	<u>.356</u>	<u>.492</u>	<u>.258</u>	<u>.443</u>	.107	<u>.444</u>
Biology 30	.244	<u>.369</u>	.449	-.096	-.115	-.117	.166
Mathematics 31	<u>.570</u>	.207	<u>.557</u>	.069	<u>.601</u>	<u>.540</u>	<u>.604</u>
Language 30	.267	-.181	-.284	-.236	-.109	<u>-.274</u>	-.321
High School Average	.330	.261	.435	.105	.331	.098	.334

+Highest three correlation coefficients associated with each individual university criterion are underscored.

TABLE B

INTERCORRELATIONS+ OF PREDICTORS AND UNIVERSITY CRITERIA, SAMPLE TWO

UNIVERSITY CRITERIA

PREDICTOR VARIABLES	Accounting 200	Business 202	Economics 200	English 210	Mathematics 240	Arts or Science Option	1st Year X̄	Business 310	Psychology 202	Business Statistics 308	Business 320	Computing Science 351	Accounting 204	Mathematics 243	Business 312	Arts or Science Option	2nd Year X̄
English 30	327	337	255	019	194	257	670	159	293	272	287	099	204	138	422	166	562
Social Studies 30	381	427	297	283	261	229	698	139	380	343	223	254	407	195	253	231	573
Mathematics 30	162	183	286	309	341	135	645	184	238	395	403	312	126	198	065	265	566
Chemistry 30	201	353	277	128	362	284	656	205	326	240	266	232	295	259	221	298	555
Physics 30	290	340	402	-066	316	-360	724	157	186	278	380	295	249	177	141	262	594
Biology 30	331	307	-107	330	672	312	874	087	006	-073	217	119	272	185	347	017	738
Mathematics 31	597	377	048	161	303	-093	907	-218	-020	253	-057	085	215	121	-378	-070	755
Language 30	283	201	188	070	181	089	635	114	285	238	309	045	032	174	240	195	545
High School X̄							455										337
Accounting 202								518	496	632	532	519	674	476	555	523	703
Business 202								554	569	592	553	551	639	325	553	619	692
Economics 200								465	315	548	680	382	351	323	505	490	575
English 210								167	391	358	307	254	328	043	301	503	388
Mathematics 240								211	343	475	433	236	558	431	320	257	474
Arts or Science Option								440	454	529	456	407	358	174	347	426	497
1st Year X̄																	855

+ Highest three correlation coefficients associated with each individual university criterion are underscored.

TABLE C

INTERCORRELATIONS+ OF PREDICTOR VARIABLES AND UNIVERSITY CRITERIA, SAMPLE THREE

UNIVERSITY CRITERIA

PREDICTOR VARIABLES	Acct. 200	Bus. 202	Econ. 200	Eng. 210	A/S Opt.	1st X̄	B. Law 310	Psyc. 202	B. Stat. 308	Bus. 320	Comput. 351	Math. 243 351	A/S Opt.	2nd X̄	Mkt. 302	Fin. 302	Bus. 302	Prod. 302	Bus. 355	I.R. 302	Econ/Com	3rd X̄ Opt.
Eng. 30	178	235	201	226	023	204	130	330	262	029	142	101	095	249	013	111	552	163	256	047	046	099
Soc. 30	077	197	159	143	192	210	274	452	178	283	226	344	043	356	128	200	059	222	138	280	136	194
Math. 30	420	050	301	280	248	377	048	264	367	290	341	329	145	348	026	469	135	000	545	120	170	325
Chem. 30	375	204	252	408	051	347	199	440	340	321	184	102	011	347	135	127	015	156	205	082	380	232
Phys. 30	350	060	170	167	067	219	320	343	439	270	327	198	006	390	028	235	083	230	441	385	337	394
Biol. 30	388	190	145	000	212	125	270	036	337	129	115	270	026	222	031	146	057	408	356	215	045	081
Math. 31	599	491	323	094	064	379	417	390	294	006	569	017	036	336	067	154	019	251	365	362	094	159
Lang. 30	300	260	336	364	380	440	270	231	269	355	291	624	066	376	104	303	095	029	221	198	206	245
H.S. X̄	439	289	343	388	195	443	311	488	442	352	333	392	055	478	134	283	127	171	380	253	261	312
Acct. 200							453	342	639	314	515	284	367	556	182	338	433	261	483	113	120	231
Bus. 202							379	323	247	471	489	100	230	486	301	250	100	438	375	422	251	398
Econ. 200							481	282	434	392	488	349	372	572	146	300	571	562	293	166	108	195
Eng. 210							251	185	372	463	428	220	175	443	028	225	174	372	261	105	141	218
A/S Opt.							131	324	253	552	364	401	021	383	072	383	499	612	382	206	298	334
1st X̄							425	408	537	608	624	407	300	660	050	448	396	638	511	257	269	385
B. Law 310															161	486	367	454	392	627	433	581
Psyc. 202															158	266	000	431	388	337	292	360
B. Stat. 308															060	436	211	476	502	392	422	506
Bus. 320															282	609	407	548	419	460	647	640
Comput. 351															042	650	386	491	639	488	354	590
Math. 243															106	529	091	365	340	209	383	400
A/S Opt.															026	271	066	273	344	302	135	297
2nd X̄															202	657	353	608	639	574	562	711

+ Highest three correlation coefficients associated with each individual university course criterion are underscored.

TABLE D

INTERCORRELATIONS+ OF PREDICTOR VARIABLES AND UNIVERSITY CRITERIA, SAMPLE FOUR

UNIVERSITY CRITERIA

PREDICTOR VARIABLES	Acct. 200	Bus. 202	Econ. 200	Eng. 210	A/S Opt.	1st X̄	B. Law 310	Psyc. 202	Stat. 205	B. Stat. 306	Bus. 320	Comput. 351	A/S Opt.	2nd X̄	Mkt. 302	Fin. 302	Prod. 302	Bus. 355	Pers. 302	E/C Opt.	3rd X̄	Bus. 400	4th X̄
Eng. 30	797	872	789	823	815	896	800	815	805	737	730	714	731	847	689	687	639	568	636	638	773	610	755
Soc. 30	679	800	741	791	817	834	779	809	731	665	651	627	742	789	641	538	607	437	668	644	717	680	755
Math. 30	860	777	712	784	761	859	763	717	845	774	713	754	776	839	609	678	671	576	500	640	740	573	764
Chem. 30	827	839	705	756	733	840	779	814	743	749	690	723	740	833	600	656	638	440	538	609	700	679	771
Phys. 30	828	791	698	765	773	829	829	790	804	758	737	768	780	844	598	751	645	605	619	672	756	652	746
Biol. 30	834	965	874	917	860	927	927	946	883	898	912	892	905	950	884	826	854	611	898	875	936	828	910
Math. 31	908	934	880	921	925	941	918	875	867	884	855	811	864	911	759	809	803	648	811	878	868	832	883
Lang. 30	784	860	744	722	771	842	810	810	700	710	650	680	681	793	601	706	572	451	515	689	718	552	737
H.S. X̄	887	931	818	861	870	954	911	896	870	849	791	829	829	937	696	762	721	601	669	733	842	718	879
Acct. 200							810	787	879	857	764	893	794	906	628	794	704	620	530	666	796	562	773
Bus. 202							883	896	836	808	767	777	764	899	703	692	670	532	721	765	828	684	861
Econ. 200							780	820	779	681	792	743	762	854	589	690	594	533	655	647	738	592	756
Eng. 210							791	810	758	698	707	680	766	826	644	563	618	464	697	629	722	725	787
A/S Opt.							809	816	766	726	676	710	794	847	639	632	685	532	632	705	777	650	823
1st X̄							891	894	877	828	807	831	842	946	718	755	730	584	700	750	852	698	869
B. Law. 310															709	721	728	570	687	753	842	632	833
Psyc. 202															694	754	726	613	735	743	857	753	872
Stat. 205															676	746	758	705	641	753	861	594	845
B. Stat. 306															679	764	775	730	583	716	853	651	818
Bus. 320															755	702	702	597	611	672	800	596	781
Comput. 351															645	856	733	678	581	649	822	626	804
A/S Opt.															589	687	724	553	557	633	746	678	774
2nd X̄															742	838	811	684	677	761	905	726	894
Mkt. 302																						453	641
Fin. 302																						627	812
Prod. 302																						700	811
Bus. 355																						530	669
Pers. 302																						577	699
E/C Opt.																						576	746
3rd X̄																						683	869

+Highest three correlation coefficients associated with each individual university course criterion are underscored

TABLE E

INTERCORRELATIONS+ OF PREDICTOR VARIABLES AND UNIVERSITY CRITERIA, SAMPLE SIX

UNIVERSITY CRITERIA

PREDICTOR VARIABLES	Acct. 200	Bus. 202	Econ. 200	Eng. 210	A/S Opt.	1st X̄	B. Law 310	Psyc. 202	Stat. 205	B.Stat.306	Bus. 320	Cmput. 351	A/S Opt.	2nd X̄	Mkt. 302	Fin. 302	Prod. 302	Bus. 355	Pers. 302	E/C Opt.	3rd X̄	Bus. 400	4th X̄
Eng. 30	286	388	241	368	255	396	350	317	141	289	088	237	343	352	267	111	382	304	040	099	276	001	004
Soc. 30	289	297	289	311	182	328	317	316	250	247	209	319	297	364	451	186	147	370	211	034	337	179	142
Math. 30	413	291	234	160	418	431	488	598	420	422	457	346	415	520	365	375	449	422	237	382	497	090	255
Chem. 30	581	530	521	370	495	637	601	638	460	513	712	722	560	786	464	563	574	617	041	473	668	201	248
Phys. 30	458	311	156	198	437	469	237	374	372	303	364	261	531	427	313	382	352	361	013	325	396	166	216
Biol. 30	488	588	390	067	343	423	613	557	338	271	539	436	282	532	503	427	629	723	365	328	672	229	390
Math. 31	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lang. 30	416	501	289	223	381	472	362	312	306	165	146	352	334	402	309	038	293	302	042	064	257	084	109
H.S.X̄	612	605	438	371	538	668	653	670	504	521	543	601	589	747	553	456	611	642	186	397	667	203	296
Acct. 200							690	719	563	528	727	590	525	767	392	552	662	693	179	316	619	065	257
Bus. 202							598	643	492	249	660	576	516	702	426	497	648	567	169	415	602	243	394
Econ. 200							406	380	290	269	481	482	394	495	302	348	357	304	180	264	372	133	208
Eng. 210							346	433	328	343	430	234	307	436	255	457	411	333	192	325	420	238	303
A/S Opt.							522	406	364	467	486	494	411	581	222	576	445	378	073	417	442	050	207
1st X̄							660	701	567	515	726	579	573	774	419	628	655	606	186	431	637	199	349
B. Law 310															577	625	709	642	395	340	729	304	480
Psyc. 202															608	534	743	729	280	436	753	249	327
Stat. 205															442	401	539	544	067	158	542	159	294
B. Stat 306															324	518	597	503	255	381	601	055	138
Bus. 320															573	670	760	721	244	568	783	354	587
Cmput.351															251	437	504	632	209	229	539	049	132
A/S Opt.															306	480	528	577	179	321	533	016	077
2nd X̄															514	639	802	787	272	406	787	156	329
Mkt. 302																						537	597
Fin. 302																						434	562
Prod. 302																						230	437
Bus. 355																						188	319
Pers. 302																						303	337
E/C Opt.																						341	506
3rd X̄																						423	572

+Highest three correlation coefficients associated with each individual course criterion are underscored

TABLE F

INTERCORRELATIONS+ OF PREDICTOR VARIABLES AND UNIVERSITY CRITERIA, SAMPLE SIX

	Acct. 200	Bus. 202	Econ. 200	Eng. 210	A/S Opt.	1st X̄	B. Law 310	Psyc. 202	Stat. 354	Bus. 320	A/S Opt.	2nd X̄	Mkt. 302	Fin. 302	Prod. 302	Bus. 354	Bus. 355	Pers. 302	E/C Opt.	3rd X̄	Bus. 400	4th X̄
Eng. 30	646	760	709	799	563	014	731	772	621	680	618	755	783	706	688	888	582	752	607	768	686	750
Soc. 30	636	708	721	715	593	137	687	663	496	586	513	652	652	718	662	745	471	712	540	682	620	706
Math. 30	674	569	578	523	440	040	611	564	774	586	681	695	598	790	626	920	570	605	571	698	658	660
Chem. 30	747	611	580	535	527	033	712	684	759	579	776	761	643	799	718	905	664	634	617	751	713	784
Phys. 30	794	718	692	683	547	020	761	717	834	721	733	819	723	803	748	960	656	703	691	794	734	740
Biol. 30	909	888	920	911	892	048	857	828	760	802	849	876	869	819	866	984	739	875	862	895	866	905
Math. 31	924	858	904	856	813	941	903	944	920	909	917	941	902	898	909	951	925	876	727	903	895	914
Lang. 30	613	654	688	702	613	026	672	672	720	659	613	733	648	639	622	904	620	716	580	718	577	684
H. S. X̄	824	797	788	781	657	039	824	803	823	750	783	877	798	881	803	923	681	815	717	877	786	860
Acct. 200							769	719	735	790	732	822	729	810	792	936	590	705	776	826	757	808
Bus. 202							818	809	660	759	692	827	794	803	753	866	607	849	701	830	768	837
Econ. 200							692	744	663	665	627	752	733	697	606	881	535	795	646	740	593	718
Eng. 210							702	693	589	708	608	742	744	682	721	804	531	800	556	737	707	749
A/S Opt.							548	635	509	586	640	643	593	563	556	761	480	616	574	624	537	633
1st X̄							017	034	025	013	013	027	009	126	053	905	118	079	011	009	101	054
B. Law 310													896	806	845	951	687	831	691	887	803	887
Psyc. 202													884	788	775	936	701	834	674	867	749	885
Stat. 354													791	804	772	988	754	786	726	863	740	797
Bus. 320													836	772	840	938	689	799	725	869	793	809
A/S Opt.													764	774	726	942	682	696	687	804	681	822
2nd X̄													918	863	867	967	749	876	774	943	826	922
Mkt. 302																					781	896
Fin. 302																					786	850
Prod. 302																					873	899
Bus. 354																					847	921
Bus. 355																					728	748
Pers. 302																					823	874
E/C Opt.																					658	777
3rd X̄																					859	937

PREDICTOR VARIABLES

UNIVERSITY CRITERIA

+Highest three correlation coefficients associated with each individual course criterion are underscored